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ABSTRACT

This book contains five articles which examine the areas of administration and instructional design, as well as the technical components of a teleconferencing system: included is an annotated bibliography on telephone education/communications which lists articles on research and theory, administration, technical components, instructional design, case studies, and teleconferencing systems. The instructional design articles focus on the ingredients of program design which maximize effectiveness of an interactive audio system. Research in listening, learning, communications, group interaction, and adult education is related to successful teaching techniques developed by instructors experienced in teaching via telephone. The articles on administration explore the overall organization of a teleconferencing system and present an overview of a modal system, with emphasis on program promotion, registration procedures, local site facilitators, and evaluation methods. The technical article describes the requirements and general design criteria for a system for teleconferencing, including the station equipment, the control center, and the transmission system. Practical solutions to problems encountered during the development and implementation stages of teleconferencing systems are suggested. (Author/CMV)

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A DESIGN FOR INTERACTIVE AUDIO

Edited by

MAVIS MONSON
LORNE PARKER
BETSY RICCOMINI

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Contact: Lorne Parker, Director
Instructional Communications Systems
Radio Hall, 975 Observatory Drive
University of Wisconsin-Extension
Madison, Wisconsin 53706

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INTRODUCTION

Teleconferencing--distant two-way telephone discussion between two or more groups--is every increasing. This low-cost means to link groups of individuals at widely separated locations sees growing use by business, training and education. Knowledge about how to design for teleconferencing will increase as more systems come into being. The present state-of-the-art is the Educational Telephone Network of the University of Wisconsin-Extension, a system which has successfully operated for over eleven years. This telephone network now reaches over 30,000 individuals across the state.

A Design for Interactive Audio brings together the expertise gained in developing and implementing this teleconferencing system. A design might be defined as a "plan or program for action, a systematic or organized framework;" interaction as "mutual or reciprocal action or influence, the sharing by two or more individuals;" audio as "the transmission, reception or reproduction of sound." Thus, A Design for Interactive Audio gives a program of organization for a unique medium--interactive audio (teleconferencing). Two considerations are central when designing for interactive audio: 1) the capacity for interaction (two-way communications) and 2) the capacity of the audio channel to carry information. These concepts underly all planning for teleconferencing.

A Design for Interactive Audio covers the design, implementation and administration of a model teleconferencing system in detail. It is a resource for those investigating teleconferencing for instructional or business/training needs, developing a teleconferencing system, or involved in course design for the distant learner.

This book contains articles covering in-depth the areas of administration, instructional design and the technical components of a teleconferencing system. In addition, an annotated bibliography lists and summarizes articles in the field of telephone education/communications including research and theory, administration, technical components, instructional design, case studies and teleconferencing systems.

In the instructional design articles, the ingredients of program design which maximize effectiveness of an interactive audio system are described. Research in listening, learning, communications, group interaction and adult education is related to successful teaching techniques developed by instructors experienced in teaching via telephone.

The administration articles explore the overall organization of a teleconferencing system and present an overview of a model system. Focuses are on program promotion, registration procedures, local site facilitators and evaluation methods.

The technical article describes the requirements and general design criteria for a technical system for teleconferencing, including the station equipment, the control center and the transmission system. This article offers practical solutions to problems encountered during the development and implementation stages of teleconferencing systems.

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A REPORT INVESTIGATING TEACHING TECHNIQUES USED

OVER THE EDUCATIONAL TELEPHONE NETWORK

UNIVERSITY OF WISCONSIN-EXTENSION

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A REPORT INVESTIGATING TEACHING TECHNIQUES USED
OVER THE EDUCATIONAL TELEPHONE NETWORK
UNIVERSITY OF WISCONSIN-EXTENSION

Mavis Monson
Instructional Communication Systems
University of Wisconsin-Extension

Introduction

"Learning is the discovery that something is possible."—Fritz Perls

Learning/teaching by telephone is a recent innovation in education. The telephone, itself, as a communication instrument is by no means "new," but the telephone in a two-way communication system between teacher and the remote classroom had its beginnings as recently as 1958 when Professor James A. Burkhart of Stephens College gave the first "tele-lecture."[1] Because the use of the telephone in education is still a recent phenomenon, research in this area is just beginning to explore some of the unique aspects of this method of instruction.

Many of the studies are written in descriptive style, and terms used in the current literature for describing this method are not uniform. For this reason I would like to set forth some of the definitions for concepts I will be referring to in this paper.

Definitions

Teleconferencing is the broad term covering "long distance discussion" of any type. It is simply the means of joining two or more groups in different locations through a telephone system.

Conference Calls are a type of teleconferencing in which ordinary telephone lines are linked together at a number of locations through the assistance of a telephone company operator.

Telelecture is a term found in early literature to describe teleconferencing used in an instructional setting. It generally refers to the conference call type of linkage.

Telephone-based instruction is a teleconferencing system which uses a private, four-wire, permanently installed system leased from the telephone company on a 24 hour a day basis.

ETN will be used to refer to Wisconsin's telephone-based instructional system (a four-wire system).

ETN Programmer/Instructor is a term for an educator using the system which will be used interchangeably within the confines of this paper, although generally the roles of "programmers" and "instructors" are filled by different persons.

Research Focused Mainly on Effectiveness

Much of the research to date has paired the face-to-face type of classroom instruction with the remote classroom being taught by telephone. The studies basically measured differences, if any, in the effectiveness of face-to-face teaching versus telelecture. Telelecture has been found to be as effective, and, in some cases, more effective than face-to-face instruction. Blackwood and Trent,[2] Gold,[3] Hartje,[4] Hoyt and Frye,[5] Pellett,[6] and Puzzuoli[7] have all shown that the telephone as a means of instruction is, indeed, an effective way of communication between teacher and student—and that students who enroll in courses taught via telephone learn as much or more than those in regular classrooms.

Although the effectiveness of telelecture has been explored by the studies mentioned, little research has been attempted in studying the effects of various techniques used during the actual instructional process via telephone. Some teaching techniques have been found to be more successful than others when using a telephone-based instructional system. Parker and Baird[8] summarized some of the techniques which have been used by instructors over the Educational Telephone Network (ETN) of the University of Wisconsin-Extension. These techniques have been used to "humanize" the experience for students and to gain their "participation" in the learning experience. Techniques such as relating to the students by name and occupation, establishing additional communication channels, personal visits by the instructor, buzz groups and panel discussions for involvement, and question-and-answer/discussion periods have been tried by individual instructors and found to be "workable."[9]

Basic Approach of This Paper

Drawing from some of these experiences of ETN programmers who have developed successful instructional techniques for use in this system and relating this information to accepted theories in the fields of communications, adult education and learning, I am presenting in this paper a compilation of suggested teaching techniques for use in a telephone-based instructional system. The suggestions included in this paper will serve as a jumping-off point for much needed research in this area and as a guide for program design for programmers new to the system.

Since the basic plan in developing this paper was to provide these guidelines for ETN programmers, its organizational approach has been in the form of a workbook format. Consequently, there are, of necessity, repetitions of certain material. Many of the techniques described are used to fulfill more than one function, i.e., a technique may be used as a personalization factor as well as a summary device.

Before presenting the techniques themselves, I would like to point out two ideas which influenced my thinking when I approached the selection of teaching techniques for use in this system: 1) the emphasis on facilitation rather than on barriers to communication and 2) careful consideration of the learning group as a unique entity which affects the choice of the technique.

Emphasis on Facilitation of Communication

Many articles have been written on telephone-based instruction which emphasize the aspects of telephone education which separate it from face-to-face classroom instruction. These articles have pointed out "barriers" rather than exploring "possibilities." My approach in this paper has been to focus on ways to facilitate communication between student and teacher, to bring together ideas that are both creative and meaningful rather than emphasizing any barriers. As Harnack and Fest[10] state, it is important to suggest means of facilitating communication rather than suggest errors to avoid:

> Concentration on barriers to communication . . assumes . . . that communication would function ideally if the barriers could only be eliminated. This assumption is not sound. Communication is a dynamic process requiring creative input. Further, the "error avoidance" approach tends to make people fearful of making mistakes, and the only sure way to avoid making mistakes is to make the biggest of all—try nothing whatsoever.

During the information gathering process for this paper, I found that the most successful ETN programmers have this willingness "to try something new"—the willingness to risk making a "mistake" in the spirit of creativity. Successful ETN instructors seem to concentrate on this "facilitation" process of good communication.

Careful Consideration of the Learning Group as a Unique Entity

As Paul Bergevin et al.[11] point out, whenever adult educators are selecting procedures (techniques), it should be remembered that each group is unique and that each person in the group is unique. A procedure which is appropriate for one group might be ill-suited to another group. "To use adult educational procedures effectively, we must be sensitive to the fact we are working with people—complex persons of flesh and blood —not statistical units or even mere members of a group. All the procedures ever devised will be of little value if we lack sound insights into human nature—our own, as well as the other person's."[12]

When selecting techniques for use over the ETN system it is important to remember this philosophy. Many different approaches have proved to be efficient and effective when using the system—as many different approaches as there are learner groups. No one way is the right way. I am presenting a variety of techniques in this paper to enable a programmer to see the wide range and flexibility of the possible formats on ETN, not to suggest that each and every one must be used in order to present a successful program over the system.

Pre-planning Considerations

I. COMMUNICATIONS THEORY AS A BASIC "TOOL"

A telephone-based instructional system is a unique medium. It has qualities which relate it to other media but it has characteristics which set it apart—the outstanding of which is its two-way interactive capability. Understanding any form of media is closely linked to communication theory. A basic understanding of communications may serve as a useful "tool" for the ETN programmer.

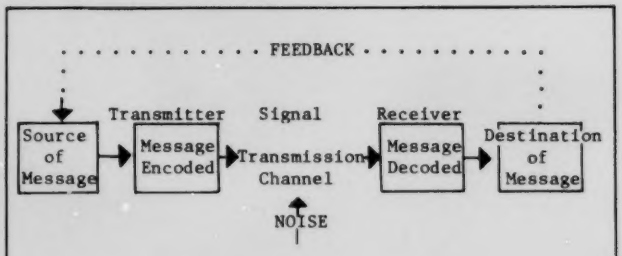
Communication comes from the Latin word "communis" —common. When we "communicate" we try to establish a "commonness" with someone.[1] This "commonness" is the ultimate objective in any communication, but what is the process that is involved in transmitting the message from the originator to the final recipient? The following model may be helpful in looking at this process.

• Communications Model

Scientists working at the Bell Laboratory developed a "communications model" which is helpful in understanding the "technical" aspect of communication. The Shannon-Weaver[2] model has been presented in slightly different ways by various authors but in its most basic form consists of the following elements: a source, a message and a destination. Other important elements are the channel, noise, and feedback.

The information source selects a desired message from among a set of possible messages and encodes this message (using signs, symbols). The transmitter transforms the selected message into a signal which is sent via a transmission channel to the receiver. The receiver may be thought of an an inverse transmitter to convert the signal back into the message. At this point, the message is decoded by the destination.[3]

When talking about the ETN system, the ETN instructor (source) would encode his subject content and transmit it via a microphone (transmitter) to telephone wires (channel). The speaker (receiver) in the classroom would convert this message so that the student (destination) could decode it into some intelligible meaning.



Communications Model

Feedback is the return or response from the destination back to the sender of the message. It serves the function of acknowledging receipt of the message and checking the accuracy of the transmission.[4] Noise is any disturbance that interferes with or distorts transmission of the message. The factor of noise can have serious impact on the success or failure of communication. As used in the communications model "noise" is confined to physical aspects (lines, microphones, speakers). In thinking about communication, however, it is important to be aware of other forms of "noise" such as distortion of messages due to poor encoding or decoding.[5]

Redundancy is the repetition of a message, possibly in different channels to overcome or bypass the effects of noise.[6]

Channel Capacity. According to Schramm,[7] a communication system will always have a maximum capacity for handling information which will depend on each link in

the chain, e.g., the capacity of the source to "encode" (how fast can the instructor talk?) or the capacity of the destination to "decode" (how fast can the student understand something explained quickly?). The weakest link in this chain will determine how strong the whole is. This has implications for designing communication experiences for maximum efficiency, e.g., avoiding "information overload."

These basic concepts: feedback, noise, redundancy and channel capacity will be explored in relation to teaching techniques used by ETN programmers.

II. PREPLANNING CONSIDERATIONS—ETN AS A UNIQUE METHOD

Although teaching by telephone is similar in many ways to teaching in a face-to-face setting, there are ways in which it is unique. Some of the ways in which it differs—how it is unique as a method—might be of value to consider before the actual programming process begins. Teaching over the ETN system is probably more successful if the following factors are employed in the planning of a program.

• Short Learning Segments

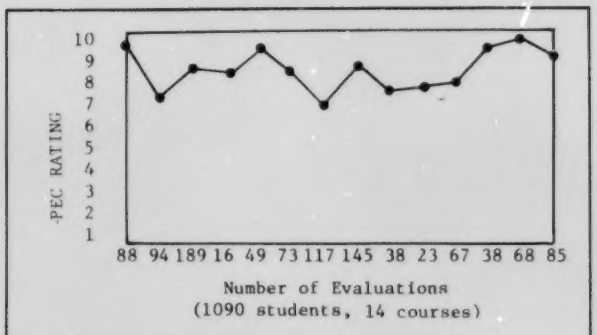
The rationale for using short learning segments is based upon a number of areas of research: "listener fatigue," short term memory retention and learner involvement. There is some question as to whether the so-called "listener fatigue" (i.e., the theory that listeners concentrating closely on an aural message become fatigued physically) mentioned by various writers is "actual fatigue" or an "attitude of fatigue."[8] Whether or not this "fatigue" is "actual" or just a "feeling," the studies point out the necessity for breaking up listening segments into shorter periods. If lagging interest and restlessness contribute to a "feeling of being tired," then the introduction of a variety of experiences and shorter times of one voice lecturing should help to ward off "listener fatigue."

Short term retention decreases as the amount of material presented increases. Klausmeier states that a large amount of material is difficult for the learner to "rehearse" effectively and also increases chances for "interference" between items held in short term memory.[9] One clear implication for instruction is that large amounts of information should not be presented in a short period of time if the intention is to have it learned and recalled.

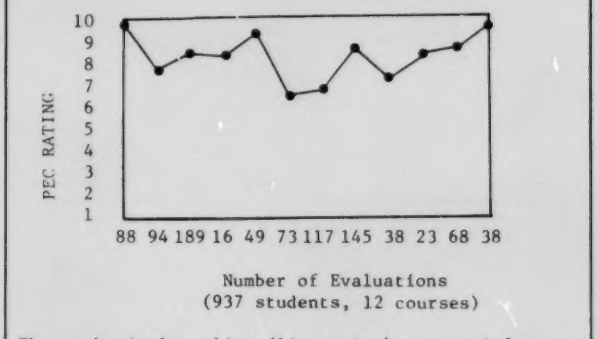
Learner involvement in the learning process, especially in terms of "feedback" is an accepted learning theory.[10] Shorter segments (10-15 minutes) of "lecturing" allow for more interaction and feedback.

• Repetition (Redundancy)

Redundancy or repetition is the repeated transmission of a message, possibly in different channels, to overcome or bypass "noise." Why is this necessary? Noise in the system, whether it is "mechanical" or "semantic," lessens communication.[11] Is "mechanical noise" a problem in using ETN: Contrary to early systems which reported a need for better "mechanical quality," the present system in use at Wisconsin seems to have overcome most of the mechanical noise. As the graphs below indicate, in response to questions posed on the Program Evaluation Checklist, 1090 and 937 students enrolled in 14 and 12 courses, respectively, during 1974-75 rated the quality of reception at a high level.



The lecturer's voice was clear and distinct.



The mechanical quality (line noise) was satisfactory.

Engineers have developed a high quality system; however, "noise" may enter at the point of destination —a shuffle of a chair or noise coming through an open window or from a hallway, so instructors build in repetition to eliminate confusion on the part of the student.

"Semantic noise" is also a rationale for building in repetition. The complexity of the material or the newness of it may influence the decision as to how often it is repeated. Learning by listening does not have the "referability" of printed material.[12] Klare[13] states that spoken materials have the tendency to drop from memory rapidly without the possibility, as in written material, for the reader to go back to an earlier word, phrase, or section.

• Feedback

Feedback is the return or response from the receiver to the sender of the message. It enables the originator to correct omissions and errors in the transmission process or even to assist the recipient in decoding the message.[14] This "circuit response" as Nichols[15] calls it, is facilitated by verbal and non verbal "cues." Since the telephone system is capable of transmission of verbal cues only, a special effort must be made to "build in" segments or activities which allow for feedback. Verbal feedback can consist of answering, questioning, discussion sessions, as well as written forms of communication.

• Simplification of Presentation

Presenting too many ideas too quickly leads to what media designers refer to as "information overload." Edgar Dale[16] cautions against presenting too many or too complex materials in a short period of time: "Listening would be improved if only one idea or

point was presented at a time." This premise is solidly supported by cognitive field theory. Hartmann[17] states that "much" rather than "many" should be a teacher's guideline. Based on the concept that the "whole field" must be meaningful, "much" information about one idea rather than "many' unrelated facts leads to greater success in the learning situation.

When referring to simplification of presentation I do not mean to imply that content must also be elementary to be successfully transmitted over a telephone system. The channel capacity, if "expanded" figuratively through the use of support materials such as printed matter is flexible enough to handle subject matter of a complex nature. For example, a successful program with portions presented in a bi-lingual format is now being taught to pharmacists over an ETN system in Florida,[18] not to mention the many successful courses with sophisticated content that are being taught over the ETN system here in Wisconsin.

• Structure

Some structuring of both the content presentation and the group's interaction appears to be helpful in telephone-based instruction.

Content Structure. Content can be structured using "organizers." Although research in listening is still tentative as to the value of these "organizers"[19] it has been shown that listeners who perceive the central ideas as they listen achieve higher comprehension scores.[20] Ausubel's[21] theory of advance organizers implies that if the learner has some mental framework in which to organize the new learning it becomes more meaningful and hence more easily learned. Advance, concurrent and post organizers have been identified as conceptual structuring aids.[22]

Group Structure. All groups seem to need some type of "structuring,"[23] which probably grows out of the need to reduce the tensions growing out of uncertainty and unpredictability in the actions of others." In large groups, for interaction to take place, the sheer complexity of relationships calls out for more centralized structuring.[24] A telephone-based system, because of the large numbers of participants and the many sites participating generates a more complex setting than a single classroom environment. It is important, then, for the ETN instructor to do some "structuring" of the discussion—to provide the opportunity for participation for all but to preplay for some of that participation by assigning feedback, using directive questioning techniques and other "pump priming" structuring devices. Structuring is justified—success seems to be greater with preplanning than by just letting "things happen."

• Participation

Why are interactive techniques and student participation considered important as part of ETN program design? Basically, building in participation techniques is founded on two concepts: 1) learning theory emphasizing that the learner should be active in the learning process[25] and 2) adult education theory that stresses participation and "ego involvement" in the teaching/learning situation.[26] Listening, in itself, of course, is a very active process. Much "mental work" can be going on while listening to another person. But when the learner becomes active in responding, he is closing the communication loop and getting feedback on his own understandings. The learner, himself, may also be a rich resource. One writer in adult education states: "Greater emphasis can be placed on techniques that tap the experience of the adult learners . . . more participatory, experiential techniques."[27] Thus by building in these interactive techniques, students become a resource in themselves and in the process probably contribute to their own deeper understandings.

• Personalization

Although research studies in adult education have not shown a correlation between building a "personalized" atmosphere (warm, supportive)[28] on the part of the teacher and the amount of learning, there are several reasons why the concept of personalizing or individualizing of the ETN experience seems desirable. The "satisfaction" with the learning experience of both the teacher and the students seems to be somewhat related to the personalization of the experience.[29] Individuals who are interacting with each other over an audio medium are in the process of "expectation setting"[30] also. What is the other person like? How can he be expected to react? By having some data by which to tie the person into his background, knowledge, interests, etc. we are able to form a "picture" of the person upon which our future communications with him can be based. Finally, adult educators stress the importance of the class members feeling that they are recognized as individuals and not just "numbers." As Knowles[31] points out, "A person tends to feel more 'adult' in an atmosphere that is friendly and informal, in which he is known by name and valued as a unique individual." Personalization techniques help to develop this friendly, informal atmosphere as well as conveying that each person is valued for his own special uniqueness.

Program Planning

I. DETERMINING LEARNER CHARACTERISTICS

Determining the characteristics of the intended audience is an important part of ETN programming. Student characteristics will affect "decisions concerning the selection of objectives, level at which to start a topic, depth of treatment and variety and extent of learning activities to be planned."[1]

Both experience and research have pointed to the necessity for "knowing the audience" in audio systems.[2] Two of the ways used by ETN instructors for gathering data about their students are: 1) Rosters (an adaptation of the "Raster Concept" explained below) and 2) Evaluation Forms. The roster is a preprogram as well as an on-going method of getting to know students; the Evaluation Form is a method for planning for future programming. A brief discussion of each follows.

• The "Raster" Concept

A raster (as described by Casey and Havron[3]) is a way, either through print or transmitted media, for the individuals involved in teleconferencing to gain knowledge of each other. The "raster" as explored by these researchers included not only personal history of participants but "communication habits and personalities of other conferees." The use of the raster in terms of "personalizing" the ETN experience will be discussed later in more detail; of importance here is that a "structuring" of the backgrounds and roles of participating individuals is conducive to developing a

meaningful program. The raster then becomes a practical "tool."

ETN Roster as an Adaptation of "Raster Concept"

ETN instructors, realizing the value of a "raster," have adopted this concept into what is known as a class roster. The roster consists of a compilation of data about students (usually organized by location) in the form of a master list. The information is obtained from registration forms prior to the first class, or if this is not possible, from students during the first class session. Survey "forms" or mail-in cards are used to gather input as to occupation, professional experience, and a few personal items. Personal visits and phone calls can add to the "raster" of both the teacher and the students.

> *"I use 5 x 8 cards as a first major input so that I know who they are, what they do, something about their professional background, something about their occupational experience. I arrange this information on a single typewritten sheet, 8 1/2 x 11, for each ETN location." (Vo-tech Teachers)*

> *"Our clientele is one that we know to some extent through a lot of activities that we have with other groups. So I feel as though we have actual personal acquaintance with a wide sample of people. So I try to picture a variety of these individuals that I might know around the state--and I aim the content to that sample." (Continuing Education for Women)*

• Evaluation Used to Identify Learner Characteristics

Evaluation as an ongoing "feedback process" is used to form a better "picture" of the clientele. Comments made on weekly evaluation sheets are helpful in determining future programs. The Program Evaluation Checklist is a useful tool for future planning.

> *"I think it is important that evaluation and research be used following an ETN program to discover as much data about the clientele being served. We use the PEC to track the needs and interests of our students with respect to this program--which hopefully will become a baseline. Through this interest checklist, we also get a reading on possible future programs. We found out from this series that the clergy we serve have a variety of interests and on the basis of this information, we are planning additional programs ranging from one hour in duration to perhaps 5 to 7 hours." (Clergy)*

II. SELECTING LEARNING OBJECTIVES

After determining the learner characteristics, the next step before developing the subject material for the course is to select the learning objectives. Kemp[4] stresses that only "after stating measurable objectives (is it) that we know what it is that we want to teach." It is at this point that it becomes clear whether our objectives are cognitive (knowledge and intellectual abilities) or affective (behaviors relating to feelings and emotions expressed as attitudes and appreciations).[5]

Does the instructor want to increase the "knowledge" of his students about a particular subject matter area? Or is his objective an affective one; does he wish the class to change their opinion or behavior in a given way? These considerations will affect the choice of format/technique to be used. For example, studies show that active participation in group discussion is more effective for opinion change than just listening to a lecturer.[6] If effective change is a learning objective—discussion may be the best choice of technique.

Flexible Objectives

Perhaps the most important consideration for ETN instructors is to keep objectives flexible. Because of the diversity of the students and the time element involved in developing a complete "raster," objectives may have to be modified on an ongoing basis. Kemp also points out that the "real" objectives for a topic may not become clear until subsequent planning steps are taken. He suggests that an instructor "expect to start with loosely worded objectives, move ahead in the planning sequence and then return to spell out the objectives in detail as each one becomes evident."[7]

III. SELECTING SUBJECT CONTENT

Because the clientele served by ETN varies so greatly it is difficult to make any generalizations. For example, attorneys, physicians, and pharmacists find it important that the content be developed around the task of "keeping up-to-date" on factual and procedural information in their respective fields. Students in education, communications and sociology may find the "issue-oriented" type of content more stimulating and useful. Adults interested in music and art may find exploration of creative ideas more important.

Several underlying considerations in teaching adults influence content, however. Kidd[8] points out that adults have had more experiences and different experiences. Relevancy to past experience is important: ". . . adults are much less ready to accept learning without clear relevance. Adults expect to find relevance both in the objectives and in the methods employed."[9]

Knowles[10] describes this "relevance" as a "problem-centered" frame of reference. "To adults, education is a process of improving their ability to deal with life problems they face now."[11]

ETN Practice

These basic themes have been useful in planning the content of ETN programs. ETN programmers try to plan the content so that it focuses on:

1) "Where the learner is" in terms of background, experience, needs, interests and motivation
2) Material that is relevant and meaningful in the "adult's world."

> *"I use the technique of focusing on issues. I think that it's very important in any kind of program to deal with serious issues that people know about. One issue that was ripe at this time was receiving a lot of press. I clipped the press stories and send photocopies of them out to all the students. And that was an issue that we all talked about. Issues bring up points that I couldn't have made any other way." (Social Workers)*

> *"We learned that we'd better design our program to fit the audience we're going to attract--or attract an audience to fit the program we've designed--one or the other. We learned that the hard way--one of our sophisticated, well-designed programs just didn't work. When we looked into it, we*

found that our course was at such a high level that although the content and materials were well designed, we were talking over the top of their heads and the only information they really retained confused them." (Physicians)

"We have a profile of our audience and we know them as a group, although not perhaps as individuals. We try in planning our program to hit the middle of the group someplace." (Pharmacists)

"Selection of course content in relation to its immediate applicability by students would make a course taught by telephone . . . more appealing to more students, particularly the full-time teacher." (Home Economics Teachers)

"We do have a diversity of backgrounds and abilities and interests in our clientele groups and as a result we have to try to appeal to both ends of the spectrum, both age-wise as well as experience--and education-wise. I think that in teaching on ETN with adults you have to have a certain amount of sophistication to appeal to these interest levels and age levels." (Music Teachers)

IV. DESIGNING STRATEGIES

Some of the factors leading to success in developing materials were touched upon in the discussion on "ETN as a Unique Method." They included short learning segments, simplification of presentation, repetition, feedback, structure, participation, and personalization. How can these concepts be operationalized into an ETN program? Some suggested approaches to "building in" these factors follow.

• Designing for Short Learning Segments

ETN programmers keep the program "moving" by dividing material presented into time periods of between 10 and 20 minutes in length. This allows for maximum feedback from students. In no case is a time segment of more than 20-25 minutes recommended. (In research on teaching university classes by "telelecture," Puzzuoli found the maximum length desirable to be no more than 20-25 minutes.)[12]

"We found this format works for us: 20 minutes--first presentation, 10 minutes--discussion, 15 minutes--second presentation. We came up with our format after reading research which showed 15-20 minutes to be the length of the attention span for adults. The 45 minute lecture just didn't 'work' with our group." (Clergy)

"You need to break in, I find, rather frequently. Perhaps every 10 minutes--with just perhaps a question-and-answer. The presentations have to be held to briefer lengths than what you'd have in a campus class." (Vo-tech Teachers)

"I feel that the audience cannot 'listen' for a very great length of time--that there have to be times of 'listening' and times of 'activity'--to break up the listening." (4-H Leaders)

"Basically we encourage our guests to present a chunk of material and then have questions. 10-15 minutes for presentation followed by a question period--rather than 1 1/2 hours of presentation and 30 minutes of questions." (Clergy)

• Designing for Repetition

What are some of the ways repetition (redundancy) can be designed into an ETN presentation? In the planning stage, repetition can be "built into" the program materials. Simply by having a printed outline that students can use as a "2nd channel" to receive the information being presented will serve as an excellent device for repetition. Study questions can be used to summarize the information that was presented on the program. Visuals (overheads, and slides) can also provide repetition of content.

During the implementation phase which will be presented in a later section, repetition can take the form of summary statements, examples and analogies used to review the materials, and the use of a "summary letter" to "tie together" the important points brought out during one particular session.

"Very often I will use a list of study questions as a summary device. As we get toward the end of the session, I'll say: 'Are there any questions on the study list that you'd like to raise?' This gives additional guidance--the class is able to sense the kind of questions they should be able to answer as a result of the readings and the session that has been presented." (Vo-tech Teachers)

"I strive for greater precision in my presenting style and I try to give them all the structure I can. For example, at a local site someone might shuffle a chair, someone might inadvertently have a window open and some noise might come into the receiving station--they may miss a line or two of what you're saying and unless they have something to go by, they may become confused." (Vo-tech Teachers)*

• Designing for Feedback

"Effective communication depends upon the receiver being active. He reacts by answering, questioning or performing, mentally or physically. There is then a return or response from receiver to sender, i.e., feedback."[13] How do ETN programmers provide for this return response? The system, itself, being 2-way interactive, provides many opportunities for direct feedback for both instructor and students via discussion and question-and-answer periods. Other forms of feedback can be planned for use "off the air" such as weekly quizzes or self-evaluation for students; ETN-O-GRAMS and postcards for feedback to the instructor; and phone calls, personal visits, and face-to-face group conferences for mutual feedback between class and teacher. Another unique form of feedback to an ETN instructor is the opportunity to listen to tapes of previous class sessions for "clues" as to how effective the communication was.

"We use a weekly evaluation sheet that gives us a rather immediate feedback on whether we've hit the target or whether we're way off base. This helps planning for future programs." (Vo-tech Teachers)

*See section on preparation of printed outline.

"We do a little bit of evaluation each week via our attendance cards. We ask each station to write back comments they might have--it tells us generally the 'happiness index' of our people from week to week." (Physicians)

"We listen to tapes of previous programs and we are able to analyze what has happened. As a result we are building on our experiences." (Music Teachers)

• Designing for Simplification of Presentation

In order to avoid "information overload" (too much information being presented at too fast a rate), ETN programmers aim for simplification of presentation. Some ETN programmers try to follow a basic guideline that not more than three major ideas be presented within one-half hour. As one educational television producer suggests—this "formula" follows from the fact that if you are going to properly introduce these main ideas via some type of advance organizer, sufficiently develop the ideas, and then provide some type of summary, THREE major ideas are the maximum number you can "cover" in 30 minutes.[14]

This "formula" appears to hold for discussion sessions, also. (Brilhart[15] found that greater learning and more satisfaction were found in groups where the average number of distinguishable topics per two-hour discussion was less than 11 than in groups where the average was more than 14.) ETN programmers tend to "focus in" on specific topics or issues to be covered during one session so that "information overload" does not occur.

Simplification of presentation is also important in terms of voices. Experiences of ETN instructors point out that although a variety of voices is an important ingredient, too many voices can lead to confusion. Here the "rule" that seems to be suggested is that four is the maximum number for any type of presentation—such as a panel discussion.

• Designing for Structure

What are some of the ways that the learning experience can be structured?

Advance organizers can help students to begin to develop a framework for their thinking before the first class. ETN adaptations of advance organizers are the "welcome letter" and the biographical sketch and picture of the guest/instructor. These techniques not only personalize but provide a frame of reference for the student. For example, the "welcome letter" generally provides a few thought questions for the student to think about before the first session regarding content to be covered.

Concurrent organizers can be planned for by developing support materials in the form of printed outlines and visual materials. The instructor will probably want to keep in mind that concurrent organizers can consist of verbal cues, as well as printed ones. (A more in-depth discussion of the use of "verbal organizers" may be found under the section on "Implementation of Program.")

Post organizers as used in ETN programming are summary devices, either verbal organizers through the use of repetition, or written such as the "summary letter" which is simply a capsulization of the important points covered in one program and sent to each individual student.

Organizers are only one form of "structuring" in the ETN program design. Provision for group interaction is planned carefully through the use of interactive techniques and "pump priming activities."

"Pump-priming activities" consist of specific programming which will stimulate discussion—such as panels or role-playing involving issues which generate strong opinions and/or ideas and tend to involve students to the point where students become eager to enter into the discussion.

Many structuring devices can be built-in to the discussion periods, such as "planting questions," using "directive questioning techniques," and "assigning feedback." Such structuring is found to assure greater participation and interaction. The concept of "specifying responsibility" also seems to be important in program design. (See "Group Discussion.")

• Designing for Participation

ETN programmers have a choice from among many of the adult education teaching techniques which provide for active learner participation. The selection of format is closely tied in with the content being taught, of course, but even "lecture" can be combined with periods for question-and-answer or discussion. Choice of format, however, is only one consideration. Providing for the development of an atmosphere that is conducive to "sharing" is important and this concept is discussed in detail in the section under "Program Implementation."

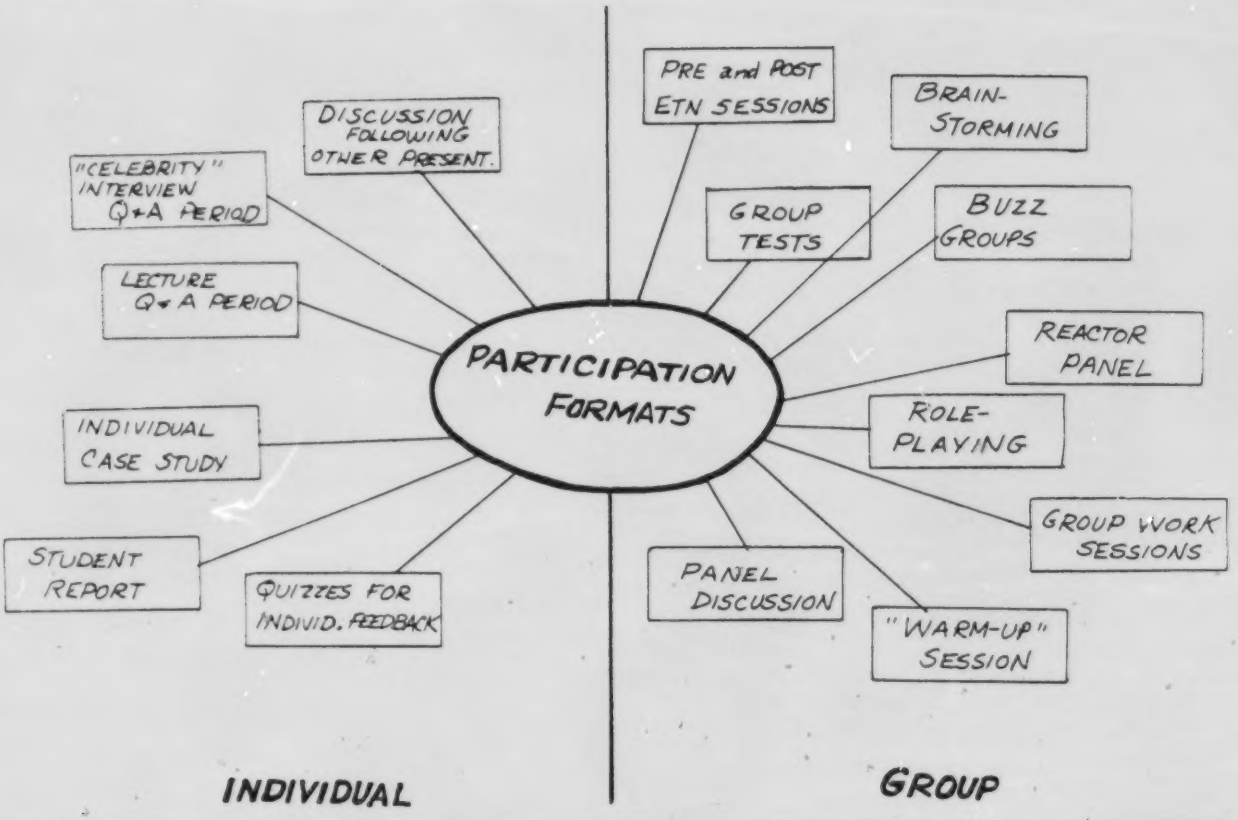
• Designing for Personalization

Personalization techniques can be carried throughout the program from the very first "welcome letter" to the final evaluating sequence. Since personalizing techniques are such an important underlying concept in ETN programming, a detailed discussion of ways to "personalize" the experience will be found in the section on "Program Implementation."

V. SELECTING THE FORMAT/TECHNIQUE

In selecting the technique (or format) most suited to the learning experience, consideration of the "givens" must be the first step. "Givens"[16] contain 1) the learners, 2) the initial stipulated information areas, 3) the educational resources, and 4) the method, which in this case would be represented by the ETN system.

Individual learners have different "preferred learning styles."[17] Some prefer to learn by listening while others may seek out print material or learning from a peer.[18] Subject content may lend itself to small group work, interactive techniques, or straightforward factual presentation. Educational resources available may include guest speakers with expertise in the subject matter area or visual backup materials. The method—ETN—lends itself to certain forms of presentation of the material. Because ETN as a method is a new experience for some instructors, a section exploring its unique considerations was presented earlier in this paper.



ETN Practice

ETN programmers base part of the selection process on their learners' preferred "styles of learning." For example, attorneys and physicians seem to be "comfortable" with the lecture format. Clergy prefer the small group as a focus for learning experiences. Education and communication courses lean heavily on interactive techniques. Some of the formats used on ETN which will be examined in detail are:

- LECTURE (combined with Question or Discussion Period)
- MODULE (with small group work at sites)
- SHORT SEGMENTS (interspersed with Question-and-Answer Period)
- INTERACTIVE TECHNIQUES (Panels, Interviews, Role Playing from central location. Case Studies, Reactor Panels, Buzz Groups, Brain Storming from individual locations)

Lecture: "We started out with an hour long program--half an hour of formal lecture and half an hour of discussion. One reason for this is that's what doctors are accustomed to. And it seemed to work quite well." (Physicians)

"We use a prerecorded lecture--usually about 50-60 minutes. We've found that if it's shorter (less than 40 minutes) they feel 'cheated,' even though they have more time left to ask questions." (Attorneys)

Module: "Although clergy enjoy 'rapping' with each other, they won't 'buzz' on the air. People will ask questions--but won't make statements. The voice coming over the air is seen as an 'authority figure.' So we use ETN as a significant module in our program and then use small groups before and after for role playing, discussion, etc. ETN is used as the 'integrating thread'--the theme or agenda. It is the resource for how and what activities are to go on in the small groups." (Clergy)

Short learning segments: "You need to break in--I find--rather frequently. Perhaps every 10 minutes--maybe just use a Socratic thing of question-and-answer. The presentations have to be held to briefer lengths than what you'd use for a campus class where you have face-to-face contact." (Vo-Tech Teachers)

"I believe in group involvement and activity because I feel that the interest span is relatively short and you have to break in--somehow there have to be times of listening and times of activity." (4-H Leaders)

Interactive techniques: "I wanted to get people involved and enable them to 'see' that they really did have an effect on their agency's image. We could have talked about it, but people wouldn't really be

involved. I wanted to immerse them in the learning experience--so I used interactive techniques such as role playing." (Social Workers)

- Lecture (Combined with Question-and-Answer or Discussion Period)

The lecture is an "efficient" technique in terms of the time factor in presenting a large amount of information to a learning group. The lecture, however, standing alone, has severe limitations—assessment cannot be accomplished in a lecture nor can feedback be provided.[19] McKeachie states that "Delay of feedback may not be a major factor in learning if the student is motivated and the material is not too difficult."[20] However, if the learning goal is that of developing concepts or problem solving skills, research shows that active participation on the part of the learner is more effective than passive listening or observing.[21]

A "learning dialogue" (opportunities for the learners to respond, to ask questions for clarification, to react to the speaker's point of view, to express disagreement) helps in assessment and feedback and performs the important function of allowing a "release of feelings."[22] Kidd points out that a "release of feelings" is important so that learning can progress freely, especially if those feelings were built upon a misunderstanding of what the speaker meant.[23]

ETN Practice

The lecture, notwithstanding its limitations, is a popular format on ETN with many professional groups. (They find that this type of learning situation fits in well with their heavily scheduled days and that it is a learning style that they are comfortable with.) However, most ETN lectures are designed around the "learning dialogue" concept as described above. Time is provided for some feedback either during the Q&A or Discussion Period. Lectures are also enriched via printed handouts which include skeleton outlines, visual material, bibliographical resources, suggestions for self-directed activities, and/or study questions to make the lecture more meaningful. The question-and-answer portion is generally a "protected" area of the total class time so that sufficient allowance is made for clarification, disagreement, or discussion of the topic in relation to personally relevant areas.

"Our students are professionals who are used to lectures. If we give less than 40 minutes lecture out of a seventy minute program, the students feel they haven't been given all the information they could have been. So we try to keep the lecture between 50-60 minutes with 20 minutes for the Q&A period." (Attorneys)

"We have a half hour of formal lecture and a half hour of discussion. We think that effective education goes on during the Q&A periods so we try to protect that period by not letting the lecture go on for more than 1/2 hour." (Physicians)

(A more complete discussion of printed backup materials will be found in the section on Program Planning.)

- Question-and-Answer Periods

A question period is a 5 to 20 minute portion of a program (during a lecture, interview, or panel discussion) during which members of the group ask questions of a speaker or other resource person.[24] The question period may be held at almost any point in the program. This portion of the learning experience becomes very meaningful to the individual student. Individual needs of students need to be taken into account and the question and answer period is one time when students share the responsibility for the "content and the format," as well as participating in the "feedback" process.

ETN Practice

Question and answer periods over ETN can vary from just "opening up the network" for questions to formalized methods of question collection. When large numbers of people are gathered at one site (Milwaukee, for example) a formal method of collecting written questions may be used.

When "class size" groups are found at many sites, then spontaneous questioning by individuals over the system seems to be quite satisfactory. People seem to "take their turn" (even with as many as 70 sites participating) and if the instructor or moderator explains the situation and asks for cooperation, the method functions smoothly. Any participants unable to have their questions answered are invited to request an answer via postal card. The moderator's role in a question-and-answer period is fourfold: 1) Encouraging participation, 2) Waiting it out for a reasonable time period if "silences" occur, 3) Repeating or restating questions that are unclear so that everyone understands the question, 4) Establishing an atmosphere that encourages the audience to feel that no question is "too silly to ask."[25]

"The written question method has worked out well for us because it allows us to handle more questions during the 20 minutes we have if they write our their questions ahead of time and the coordinator reads them. This is especially true in Milwaukee where there might be 80 people or so and we would have to wait for them to get to the mike." (Attorneys)

"If questions aren't coming in, the moderator will ask questions himself." (Physicians)

"We've always had the feeling that this is where the real learning takes place. The lecture is what the faculty member wants the students to know--the questions are what they want to know." (Physicians)

"We get 3-5 questions with an on-campus conference and 30-35 questions with a half hour talk on ETN. We think it's because ETN promotes a little more active participation than passive. It's easier to ask questions when in a small group of people than when you are in a conference room with 200 people. (Physicians)

. . . (contrast) . . . "Students don't raise questions as readily over the ETN system as they do when they're in class with you. They feel they're delaying the progress of the program--they know that it's got x number of minutes for this week--I think you have to give them great encouragement to come forth." (Vo-tech Teachers)

"I have just used the technique of asking 'Are there any questions?' instead of going down the list of stations which I feel wastes time and loses participants' enthusiasm and interest. Maybe two or three questions may come in at exactly the same time, but they can wait their turn. I just reply to the first one I hear." (Continuing Education for Women)

"As moderator I try to see that the person in the class on-campus asks the question by speaking into the microphone so that the rest of the state can hear the question directly, not paraphrased by the speaker." (Continuing Education for Women)

"Our guest, an expert in a medical specialty, talked in a very informal way--and then the audience was able to ask questions of him. It was very successful." (Nurses)

• Celebrity/National Expertise

Celebrities and nationally known authorities are resources which provide invaluable learning experiences. It is a way to bring significant individuals who might otherwise be unavailable into the classroom. Indeed, this type of "programming" was one of the very first uses of telephone education. James Burkhart[26] who started using this technique in the late 50's says it gave the class opportunity . . . in meeting prominent persons informally, in hearing their "off the record" comments. Heiliger[27] describes one student reporting that he appreciated "the up-to-dateness, the chance to relate to what were obviously outstanding people in the field and the opportunity to 'talk back' to (them)."

The concept of direct involvement in the responsibility for the learning situation on the part of the adult learner is realized in the celebrity interview. Knowles[28] points out how important it is for the adult instructor to treat the learning-teaching transaction as the mutual responsibility of learners and teacher. "In fact, the teacher's role is redefined as that of a procedural technician, resource person, and coinquirer . . ."[29] As a coinquirer, the teacher can bring the rich resources of a celebrity or national figure into the ETN classroom.

ETN Practice

ETN programmers have found that this ability to interact with the "names" in a particular field an inexpensive and convenient way to add interest, understanding and participation to their ETN classes. The celebrity may participate for the entire program via long distance telephone or a prerecorded segment may be used with the guest coming on "live" for the class discussion.

Preparation for Celebrity/National Expertise

It is important that the guests "know about" the audience they will be talking with and also the objectives of the course, itself, so guests should be provided with ETN class rosters and perhaps some of the course materials. Cassette copies of past programs may also be helpful to the guest in getting a "feel" for how they might present their own material on the ETN program. Conversely, students should be prepared in advance with a short biography of the guest and an outline of what is to be presented, if possible. It is sometimes difficult when working with celebrities unfamiliar with teaching techniques to obtain this kind of printed guideline—if so, programmers must focus in on some "common ground" and help direct the discussion in a meaningful way.

"Frequently collegiate institutions can't afford to draw upon this rich resource because of the cost factor. We can bring people from New York via communication lines to talk to a limited audience. (Music Teachers)

"By going to the artist wherever he is (by telephone), he can be persuaded to participate in an adult education venture like this because he doesn't have to lose travel time." (Music Teachers)

"You're dealing with an individual who generally does not have a wealth of teaching experience--so, it's very difficult to obtain outlines in advance. We approach it from the standpoint of talking with them in an area that they feel most comfortable with. Educators are used to preparing outlines and being organized, but a top flight artist just is not used to that so you lead him into the presentation." (Music Teachers)

"We started our dialogue from the standpoint of our both knowing about a particular musical composition--the interview was extremely successful--so you have to take your person where he is." (Music Teachers)

• Interview

The interview is a presentation during which one or two resource persons respond to questioning by an interviewer about a previously determined topic.[30] The interview is a relaxed and informal way of presenting information, 2) it stimulates interest in a topic, 3) it encourages audience participation, 4) it provides, by way of the interviewer, a bridge between the resource person and the audience, and 5) it helps the group gain knowledge from an authority or experienced person in the field.[31]

Although this technique is not considered a "complex one" it is not "self-operating," as one writer cautions.[32] The teacher must be thoroughly familiar with the topic or area of discussion and prepared to direct the discussion along profitable lines. It is important that the resource person understand the goal which the interview is supposed to achieve. Meeting or talking with the instructor prior to the program to discuss these aims is an important part of setting up this format. As the interview progresses, the interviewer can help to keep the interview in a conversational style by improvising questions as appropriate, clarifying or requesting clarification and making an occasional summary.

ETN Practice

This format used on ETN is a very successful one. The variety of voices makes for an interesting and stimulating program. The relatively short presentation (about 10-20 minutes) is perfectly in tune with learning in "bits." It encourages active participation on the part of the audience during the discussion period when the network is opened up to questions. The

informal, conversational way of presenting the information is especially suited to ETN. (Although most interviews are conducted in this informal style, some guest lecturers will feel more comfortable with structured situations.) It is important for the guest to know about the students and objectives of the course ahead of program time to assure maximum learning. Again, it is important for the ETN programmer to summarize what has happened.

> *"You need to spend some time talking with the resource people you use to make sure they deal with what's important to the class." (Vo-tech Teachers)*

> *"The only preparation I gave my guests was to tell them 'There's so much time--we want you to talk about your experiences and how they could be used, as it is coming from you as a colleague, rather than me an outsider.' Most of the guests are people in the county--actively involved in the program at the same level as the intended audience. And the audience will respect any leader saying something rather than it coming from me--they identify with them." (4-H Leaders)*

> *"I try always to have these people live and on line which is very easy to do with the ETN system, so that I can interview them with perhaps 5, 6, or 8 selected questions that seem to be important. Then we just open up the network so the students can talk to the resource person." (Vo-tech Teachers)*

> *"I may use 4 or 5 interviews during the term that I feel add interest. I have students themselves have input on these interviews. Evaluations of one class I teach show that students like to hear from people who are in the state agencies so I try to have interviews with these people." (Vo-tech Education)*

> *"We have used the interview format between two persons--where we would have one faculty member in the originating studio and another on the ETN lines somewhere out in the state." (Nurses)*

> *"We have used taped inserts that have been formally prepared before."*

> *"We found some guest faculty will be very adaptable, very flexible to any suggestions--and then there are those who are very structured." (Nurses)*

• Case Studies

Case studies are useful for revealing the problems and issues found in a particular situation. They are helpful in analysis—identifying fact from opinion, weighing and testing alternatives, considering values.[33] Case studies have application particularly to fields where there are few or no final answers and where judgment is the essential quality. This technique's "reality" and the effort created in stating principles in terms of good practices make it of value to adult groups.[34]

Case studies in adult education are generally thought of as written, detailed reports describing an event or a situation that a learning group can profitably analyze and discuss. The group generally reads the case study before the meeting.

ETN Practice

The written case study technique can, of course, be used successfully over ETN as a stimulus to discussion, but ETN programmers most often use oral presentations by individual students. This adaptation of the case study technique results in increased amounts of participation and interaction by the rest of the group. Several class members are assigned the presentation of "case studies" from their own experiences. The technique must be carefully planned by the programmer in advance, especially the choice of presenters. As Kidd points out, "what makes a particular case useful is its reality, its relevance to problems faced by others, the completeness of available data, and the significance of the issues or values at stake." For this reason, an ETN programmer makes a deliberate effort to "screen" the possible presenters to make sure that what will be presented will be relevant and to the point. This involves prior phone calls to "chat" with possible student presenters. And since this technique, if oral, does not allow for prior, detailed study of the case by the group, the case study presented must be kept rather short and concise (about 5 minutes) so that pertinent details can be assimilated.

> *"In some cases, the people I called were not aware I was interviewing them for possible case study presenters. I simply said to them, 'Do you have an opinion on this'. If they came back with an experience they'd had, I'd say, Well, during our next program we're going to be talking about this and why don't you give a case study on it?" (Social Workers)*

> *"I feel it's very important to contact these people on an individual basis on the phone and to talk to them rather than contacting them by letter. First of all, you get their voice quality and second, you get some idea of what they're going to say which is important because they are going to be sharing this with an audience which might number 300 people." (Social Workers)*

> *"I have even pre-recorded students to see how they would do. I wanted to be sure they would have something to share with the group as an experience." (Social Workers)*

> *"I give them 5 minutes (a person can cover a lot in that time period) and suggest they not write up the study word for word, but use an outline to make sure they cover the main points." (Social Workers)*

> *"I consider this a pump priming activity. I wanted people to interact and we had a very diverse mixture of people in this course--people who don't normally interact in their job situations. So why should we expect them to interact over ETN? So we had to get something going--and we used the case studies." (Social Workers)*

> *"We had groups work at individual sites with written case studies containing conflict situations which then became the agenda for the reporting to the statewide class." (Clergy)*

• Student Reports

Adult educators point out the role that the adult students themselves can play as "resources of learning."[35] Because adults' backgrounds and experiences are so rich, that expertise can be "tapped" and added to the learning environment.

ETN Practice

ETN instructors use students' reports as one way to tap this resource. Using a student report format is also a way to increase the participation of individual students. The report may be based upon an individual project, experience, or case study. Arrangements for the selection and preparation of the student are always done in advance. This format is one of the most straightforward and easy-to-arrange techniques. Generally preparation is kept simple. A student will be asked to give a report by saying "Briefly, tell us about what you are doing—you will have about 5 minutes."

> *"In a Vocational-Technical Education course, students were asked at different locations to give brief reports (about 5 minutes long)."*

• Buzz Group

A "buzz group" is the small group formed from the larger audience in order to provide the most opportunity for individual participation in discussion. Each small group, usually consisting of 5-6 members, is given 5-10 minutes for discussion. It is often used following a lecture or panel as a means of generating questions.[36] The assignment for the buzz group is generally kept simple if the group is to "report back"--for example: "Develop one question," "Agree on one disadvantage," "make two suggestions."[37] In most cases, the discussion should not extend beyond 20 minutes.

ETN Practice

ETN programmers use the "buzz group" concept in the way described above and also use this format to facilitate small group work at the sites. When the number of students at an individual location is too great to permit efficient discussion at that location, the instructor may ask the group to divide into subgroups. In ETN practice, the "buzz group" technique is also used for longer and more complex discussions at individual locations which may last as long as 20-30 minutes.

> *"If the group is very large, you may even help the group to respond by saying" The group at Janesville is large, we'd like to have you split into 3 groups of 5. You can decide how you want to arrange them, but continue to operate in those groups from now on." (Vo-tech Teachers)*

> *"Local Wisconsin water supply operators use approximately 20-30 minutes of the 2 hour ETN program for local discussion. After the main ETN presentation, groups break off from the network to discuss how the day's topic is related to their local situation. This gives participants another opportunity to actively participate in the two way dialogue and also helps keep program content relevant and practical."*

• Group Work Sessions

One of the important characteristics of adult learning groups should be that of "sharing (the) responsibility for helping one another learn."[38] Group work sessions can lead to more rapport within the group and give the adult the satisfaction that he is lending a hand in the learning process of his peers. Group work sessions also allow for participation and application of content directly to relevant problems.

ETN Practice

Examples in ETN practice are many and varied. They range from formal to informal, structured to spontaneous. There are assigned group reactor sessions, group test work, informal work sessions, group work that just "happens," pre and post group activities that are suggested by the course syllabus, and formal group sessions led by local leaders.

> *"I ask that the quizzes be done by the group, not individually at the station. This approach involves the whole group in discussion. They write their answers on a form I provide and then each person signs it at the bottom. The group test really does get the group to sit down and talk about the answers because I use this as a part of their grading." (Vo-tech Teachers)*

> *"The college students I'm teaching came into the room where they had their ETN class in their free periods and worked together on their homework. I noted that where the students worked together, they did very well on the exam--they sort of 'taught' each other when I wasn't there." (Engineering Mechanics Undergrads)*

> *"When I was introducing a new woodworking course, the groups brought in their own hammers and took time to physically do something--this broke down the 'ice' and got those people talking. That particular evening I was probably on the air only half or two-thirds of the time--but it was planned that way." (4-H Leaders)*

> *"I have a strong feeling that the interest span is relatively short and you have to break in so they don't lose interest. I think you can do that by having different activities." (4-H Leaders)*

> *"If I assign a question that an individual station is to work on and respond to the next time, I know that when we go 'off the air' the people will sit down and say, 'He's going to ask something next week and we've got to have an answer.' By assigning group work I know I get group dialogue going." (Vo-Tech Teachers)*

> *"In my wood identification program for 4-H leaders, I've provided them material to work with. We had a 'key' and at each site they had samples of wood. We'd ask them to work right along with us using the 'key' as our guide. When we had the session on wood finishing, we had sample finishes mixed for them to apply." (4-H Leaders)*

• Pre and Post ETN Sessions

In teaching the adult learner one of the important concepts is the meaningfulness or relevancy of the material being learned to the adult's own situation. As Kidd points out: "It seems to be clear from all the evidence that adults . . . are interested in the application of what they learn. Adults need to believe that 'new' is relevant."[39]

ETN Practice

The need for relevancy has been considered by ETN programmers by designing "pre" and "post" ETN sessions at individual sites. Leaders at each location help to facilitate these activities which become problem-solving opportunities specific to the learner's own setting.

> *"We try to offer our students stimulus to 'group' within their own sites. The pre and post class activity guideline in the syllabus suggests ways to participate in activity specific to their own situations. The goal for the learning is for them to do something with the information specific to their own setting." (Nurses)*

> *"Our main vehicle for the teaching/learning process is the small group. Groups are conducted by on-site faculty before and after the ETN program using role-playing, case method, group discussion, and clinical analysis of data." (Clergy)*

• Panel Discussions

Panel discussions are useful in bringing in a wide range of informed opinion to an audience. They are especially good in dealing with a complex or controversial issue. The panel members are selected on the basis of previously demonstrated interest and competency in the subject to be discussed and their ability to verbalize before an audience. They usually lead to an atmosphere of informality. Bergevin[40] cautions that since the panel does involve informal conversation, it sometimes does not lend itself to an orderly, systematic presentation of information. This would suggest an awareness on the part of the moderator for frequent, ongoing "summaries" and a final summing up of the presentation.

ETN Practice

Panels are useful in presenting material over ETN for a number of reasons, some of which are suggested above. 1) Informality. Panels contribute a feeling of informality, a quality which has been mentioned as desirable in good communications technique. 2) Variety. The use of several voices in a presentation contributes to a variety which stimulates attention and interest. 3) Expertise. The ease of bringing in "expertise" from different locations, in or out of state, is an asset of ETN which should not be overlooked.

Preplanning is important for successful panel presentations. The moderator's choice of panel participants, as well as his skill in drawing out important "learnings" for the audience, is critical in the success of this technique. Students should be prepared by previous assigned readings or other background material.

> *"I feel 4 is the maximum number for panels--so each member has enough time to present their ideas fairly completely and so that the audience can identify each member by his/her voice." (Continuing Education for Women)*

> *"When I ask people to be on ETN, I frequently deliberately do it by telephone so I can judge their voice. I try to think of some excuse to call them ahead of time." (Continuing Education for Women)*

> *"I have each panel member give a short (5 minute) comment about the program's topic--how does he view it? Then we open it up to statewide discussion and we usually have a total interactive discussion." (Social Workers)*

> *"Because I feel it tends to be difficult for a listening audience to keep their attention up over any length of time with the same voice (unless it's an extremely dynamic voice and a lot of content is being presented), I have relied heavily on the panel technique--the variety of voices and the exchange keeps the listener's attention." (Continuing Education for Women)*

> *"We 'patched' panel members in from different locations. One was home eating his lunch, one was in his office, another attended an ETN class and participated with the group. (We tried to recommend the latter, but schedules didn't always permit, so they participated from where they were.)" (Social Workers)*

> *"Students were prepared for the discussion by being given assigned readings in the syllabus the previous class session." (Social Workers)*

> *"My job is basically to guide these learning experiences and to make sure that certain points are amplified because a lot of these things can be 'lost.' So my job is to do this in a summary." (Social Workers)*

> *"In some cases you might not have time to tie things together because you have a number of guests participating. You might use a technique which has been very successful, that of sending each person a letter. This is not only an individualizing and personalizing technique but becomes an effective summary device. It sums up what was presented in the program via a 'Here's what I got out of the program' device." (Social Workers)*

• Reactor Panels

Reactor panels are a variation of the adult education technique known as the "listening group." A "listening group" is assigned specific listening tasks to be performed during a speech, panel. The format of the desired response should be clear—will it be ideas or questions?[41]

ETN Practice

ETN reactor panels perform an important role in the clarification of important points and ideas presented by an ETN speaker. Students are chosen as "panelists" to react to the speaker's presentation as representatives of the entire audience. Success depends in part on reactor panel members and the moderator agreeing on program objectives and procedures before the actual ETN program.

The reactor panel is also used to facilitate the asking of "common audience questions." Once these questions have been answered to the benefit of the entire group, then the ETN network can be opened for questions from the statewide audience.

Reactor panel members can be chosen from one specific site location or students from several locations who may not even be acquainted with each other may be asked to serve on a panel. The reactor panel is always preassigned before the program and should be limited in number, three being the optimum. Reactor panels are used in a variety of ways as the following examples show.

> *"To get questions and discussion, I may say in some cases: 'The following listening stations be ready to react next week to some of these questions . . .'" (Vo-tech Teachers)*

> *"If you have 5 or 6 counties you can get discussion back and forth, but if you have 40 counties, then by the time the 40th one reports, 35 are tired of waiting. So, in advance, it's better to have some counties designated as a 'report-in' to answer the question 'How do you agree with this?'" (4-H Leaders)*

> *"I set up a reactor panel made up of a cross-section of people so that they could react and relate this to their specific situation (referring to panel and role playing presentation). They would be at different locations--individual students that probably never even knew each other." (Social Workers)*

> *"I would suggest calling people in advance and asking them to be responsible for reacting. You could say (on the air) 'Fond du Lac, Merrill and Sheboygan . . . I want you as groups to serve as reactor panels on what's being said.' But that's not quite as successful. You'll have some locations that will not reply. Making an individual responsible 'works'--they know that they're responsible for that portion of the program." (Social Workers)*

• Role Playing

Role playing is a technique of practicing human relations skills under circumstances that approximate real life itself. Rather than just talking about it or being told about it, role players learn by doing—and audience members learn by observing and analyzing. Kidd[42] calls role playing an excellent "mistake-free" situation for adults. It allows the adult to investigate his feelings and try out solutions under conditions where "real life is simulated but where the effects of a 'mistake' are not disastrous." According to Kidd, this is extremely important to the adult who is reluctant to "lose face" at home or on the job.[43] Another advantage of role playing is that it makes discussion more realistic. It allows people to translate theory into meaningful behavior.

ETN Practice

ETN programmers have adapted the technique of role playing in several different ways. Examples vary from carefully structured pre-recorded "vignettes" to individual groups using the ETN as a stimulus for role playing at their own sites under the guidance of local leaders. ETN programmers find it is important to plan for a suitable lead-in introduction and for problem-solving discussion, summary and follow-up assignments to see that intended objectives are met.

> *"In an ETN program for foster parents and social workers, short vignettes were used to convey foster parent feelings." (Social Workers)*

> *"Three to four voices seem to be the best number for this type of activity over ETN." (Social Workers)*

> *"We thought of 4 major roles that an agency workers might run into in their day-to-day activities. Then we taped these 'bits' ahead of time using student actors so the role playing segments were 'good' audio experiences--realistic background noises, etc., because they were taped right on the scene. Each segment was short--about 5 minutes long." (Social Workers)*

> *"We followed up the role playing-discussion session with assignments for the next week--selecting people to come up with answers as to what they would have done in that situation." (Social Workers)*

• Brainstorming

"Brainstorming is the spontaneous outpouring of ideas pertinent to an area of interest or need of a group."[44] The quantity of ideas is more important than quality in this technique and the ideas do not have to be related to each other. Bergevin[45] suggests that frequently people who are "hesitant in offering suggestions will relinquish this restraint when they present their ideas without feeling compelled to develop or defend them." In planning this technique, the problem to be brainstormed should be specific, simple and preferably familiar to the group.[46]

ETN Practice

Brainstorming has been found to be a workable technique over the ETN network to help get the creative energy flowing from a group by spontaneous response and to help encourage maximum participation by the entire audience. Since ideas flow more freely when the group's ideas are not to be immediately evaluated by them, editing and synthesis are accomplished after the ETN session by a selected group or during a follow-up ETN session which is specifically scheduled to appraise

and further evaluate edited ideas.

> *"We list the ground rules such as a time limit of 10 minutes and then open up the network for suggestions." (Water Supply Operators)*
>
> *"We have used ETN brainstorming as a method for collecting ideas for historical programs on Wisconsin." (Wisconsin Heritage Programs)*
>
> *"I schedule a follow-up session on ETN to evaluate and discuss the ideas collected during the brainstorming."*
>
> *"This technique is sometimes used during our statewide committee meetings in bringing out a large number of ideas from the group."*

VI. DEVELOPING SUPPORT MATERIALS

Careful design of support materials is a factor in the success of any ETN program. Support materials form valuable backup for the ETN experience and include printed outlines, visual materials, syllabus materials, self-learning activity guides, "learning packages," and library services.

• Printed Outline

Importance of Printed Outline. In developing programming materials most ETN instructors consider some form of printed outline as a vital ingredient. Why is this printed outline considered so important? The main reasons that suggest the use of a written outline for ETN classes are:

1) Elimination of excessive note-taking during the program. In research in listening comprehension, note-taking was found to be of little or no value in increasing learning; in fact, it may possibly interfere with the listening process.[47] There may be some "attentional effect" (active attitude of participation) which may lessen the listener's tendency to become "sidetracked" in his thinking,[48] but most writers agree that notetaking is a "mechanical process" that replaces valuable "listening time" with "writing time."[49,50]
2) Review purposes. A written record is a useful tool for a student. Written notes provide for a kind of "referability"[51] (opportunity to review) which complements aural messages. It is important to be able to go back and recheck the message. Rankin showed that at least half of what we hear is immediately forgotten (no matter how carefully we thought we had listened), and two months after listening to a message, the average person will remember only about 25% of what was said.[52]
3) "2nd channel" presentation. Communication theory suggests that there is an advantage in presenting the message in a variety of channels. Studies have shown, for example, that presenting printed words in a film leads to greater comprehension.[53]
4) Learner styles. Some learners have a greater facility to learn from aural messages, others from print or visual messages.[54]
5) Advance, concurrent, and post organizers. There may be some advantage depending on subject matter and type of written outline or summary presented in helping the student to "structure" the material to be learned.[55]

Presenting the basic content, then, in abbreviated, printed form is based upon five main considerations: elimination of excessive note-taking, review purposes, "2nd channel" presentation, learner styles, and "organizers."

Summary for Preparation of Written Handouts. Although every subject matter area probably calls for a different treatment and each instructor has a unique style, some basic guidelines in preparing written outlines may be helpful. Instructors have found that numbering different sections in the outline provides a quick referencing system as the program moves along. They can then simply refer to the section being covered by number. Leaving room for the students to add their own notes ("white space") provides them with their own "working paper."

An example of the way that an outline is used over the system is the "topic outline" developed by one ETN instructor:

> The topic outline. We prepare a topic outline for each broadcast session—each outline is numbered by session. Session 3's outline would then, for example, be subdivided into 3.11, 3.12, 3.13, and 3.14. When I go through my presentation, I can refer specifically to a subpoint that is being covered and the students will know exactly where I am and when I'm shifting.
>
> I'll indicate: "We're talking now about 3.21, that's the Northwest Ordinance, or we're talking about 3.22, the Oral Land Grant Act of 1862." So they have right in front of them the same numbers I'm referring to and they can follow right along. I allow a couple of inches of "white space" between each subtopic so that the students can write in some sort of note. They use the topic outline, then, as a "working paper." (Vo-tech Teachers)

ETN Practice

Most ETN programmers use the standard "skeleton outline" for their presentation. Guest speakers are asked to provide outlines, if at all possible.

> *"We feel that handouts where the students can concentrate on listening as opposed to writing are a great help. The student can read along and put questions down that he wants to ask or clarification of certain points." (Pharmacists)*
>
> *"We use an outline with sub-topics, drawings of structures, tables, graphs. We try to provide a fairly definitive outline as far as points mentioned in the lecture go. And if we can present the information via graph as opposed to a written statement of 2 or 3 lines, we try to do that." (Pharmacists)*
>
> *"If there's something that will be of permanent use to a student--that he might want to keep on file--we'll provide it in print form so he can keep a record of it." (Physicians)*

• Syllabus Materials

ETN programmers try to develop syllabus materials for their courses if access to certain kinds of information may be difficult for students to obtain. The material developed by an ETN instructor can range from a simple "supplementary photocopied article" which expands on the topic of the program to elaborate syllabus

materials of 300-400 pages used in several courses for physicians. This support material may include charts, graphs, and pictorials which have been presented in slide form during the program.

> *"In addition to the topic outline, if there is an area not covered by the text, we supplement this with an abstract of a page or two of additional readings. For the students in the field who don't have ready access to a library and the journals you want them to see, it's important to enclose copies of the articles. It certainly reduces the student's frustration." (Vo-tech Teachers)*

> *"Access to material is a very real problem to the distant learners and one of the things that I feel very strongly about is to provide a syllabus or 'workbook.' Within that 'handbook' were readings that I felt would provide the class with stimulating bits of information--'thought pieces.'" (Social Workers)*

> *"I think developing 'work material' may be better than showing slides--if each person has a drawing depicting something you are going to cover--that he can carry home with him." (4-H Leaders)*

• Visual Materials

Many ETN instructors have, over time, discovered that slides or other A/V materials as such are not necessarily a "must" for a successful program. There are times when the content being presented "calls for" a pictorial representation of some type, but even then, more and more programmers are finding that print materials can serve this purpose quite well (as well as allowing students to retain their copy of the visual for their own personal record). Many courses continue to incorporate slides as an important element because of content material which would not lend itself well to print. Medicine, for example, continues to use slides in its planning, because the color projection helps to illustrate concepts in courses such as dermatology.

> *"Slides are beneficial in some ways but the logistics of getting everybody to move slides at the same time is somewhat difficult. So I've incorporated the significant slides which have been diagrams into the syllabus materials so that they can look at them there. I'm not adverse to slides--I think they would be very helpful in many cases." (Vo-tech Teachers)*

> *"We suggest our instructors have some slides as a focus for attention--an average of about 20 slides for a half hour program, but again within the context of 'What does the program need?' We have more and more programs with no slides at all--it just seems to be evolving." (Physicians)*

> *"We take a look at the visuals the speaker has. If it's something with an awful lot of detail on it or if it's something that would be of permanent use to the student, that he might want to keep on file, we'll get it fast-copied." (Physicians)*

• Self-Learning Activities

"The active participation in self-learning activities by students is related to the success of teaching university extension by telelecture," Puzzuoli[56] states as one conclusion of his research. Adult education theory stresses the concept of the adult as "self-directive": Knowles[57] states ". . . those methods and techniques which involve the individual most deeply in self-directed inquiry will produce the greatest learning."

ETN Practice

Self-learning activities are designed into ETN programs by relating specific assignments to problems based on the students' own areas of occupation or interest. The project is "tailored" to key problems that students are dealing with. Another example of stimulating self-directed inquiry is the "thought pieces" presented in a syllabus form. These collections of articles present no answers—only questions to stimulate thinking.

> *"The projects were on an individual basis--so they could be tailored to the individual's job or function within the agency. And that worked out well, because they were dealing with their own situation. 'How can you improve your situation at your position in that agency?' And their ideas and capacity for doing this were excellent." (Social Workers)*

> *"In addition to outlining content, resources are identified which students might use in their own self-directed activity." (Nurses)*

• "Learning Packages"

One of the ways that ETN has adapted the use of support materials is to create a "learning package" which is mailed to each student. What does this package consist of? It may be simple: 1) a "topical outline" for each session, 2) supplementary materials such as several photocopied articles and 3) a list of "study questions." Or it may be as sophisticated as: a complete syllabus, bibliography of materials, biographical material of speakers, outline of self-learning activities, and printed materials, pamphlets and other resources. One instructor developed a "learning package" consisting of materials to be used for practical laboratory sessions in wood identification and wood finishing.

By receiving materials in advance, enthusiasm is generated on the part of the student, and the materials provide a framework or organizer prior to the actual program time which may stimulate questions. A practicality of the learning package is that the printed bibliographical references save valuable "air time" for discussion; any type of reference or list that can be sent out ahead of time eliminates time spent giving such information during class time.

> *"We included a brief profile of the guest faculty member, an outline (depending on the speaker it may be very detailed or not), a reading list that pertains to the clinical area, printed articles that have been in professional journals, pamphlets from different companies (requested by staff), patient education booklets." (Nurses)*

"In woodworking classes for wood identification, I've provided samples of wood, knives, hand lenses for each of 5 to work with. I have sent out packets for wood finishing lessons which included wood with different stains on it, ingredients, containers, stirrers, etc., for mixing up stain and applying it. One time I had over 26 articles in one kit." (4-H Leaders)

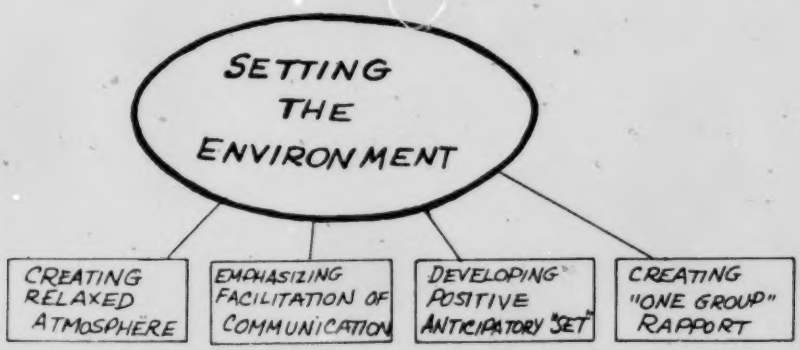
"We use the technique of sending out bibliographies in advance so the students don't have to take valuable time copying down lists. Whatever can be handed out in advance saves valuable time for discussion. We indicate musical works that will be considered so that the participants can bring their own copies and follow along as the work is being considered." (Music Teachers)

• Library Services Access

ETN instructors plan so that students at remote locations will still enjoy access to library materials. Library references can be made available at "field sites" as well as through a strong working relationship with the UWEX library in Madison. Community public libraries and University libraries at various locations around the state can also be tied into this support system. Instructors pre-plan so that the services are available and then encourage students to make use of these library references.

"One of the most important things to the students is that they have access to reference materials. The Extension Library Service has been very helpful in this. We've had libraries in the 'field' so that people can have access to them on site; we've also had a mail-in procedure so they could mail-in for additional references." (Vo-tech Teachers)

Program Implementation



I. SETTING THE ENVIRONMENT

Among the students at the first ETN class may be many who have never taken a class using this method. The instructor is then introducing the learning group to not only new content, but to a new medium. Instructors have found that creating an environment of learning-and-sharing over this new medium is an initial task of that first meeting; that a "relaxed atmosphere" and a favorable "anticipatory set" are important to success.

• Creating a Relaxed Atmosphere

Why is a "relaxed atmosphere" so important in the "climate of learning"? Both communication theorists and learning theorists support the view that the more "supportive" the climate, the greater the chance for efficient communication. Anxiety and stress, according to Gynther,[1] reduce communication. Gibb[2] points out that a supportive climate allows the receiver to reduce his "defenses" and he becomes "better able to concentrate upon the structure, the content and the cognitive meanings of the message." Klausmeier[3] states that most learning situations are anxiety-producing and that teachers should work towards reducing that anxiety.

ETN Practice

ETN instructors try to create a "relaxed atmosphere" that first evening by allowing their own personalities to "come through."

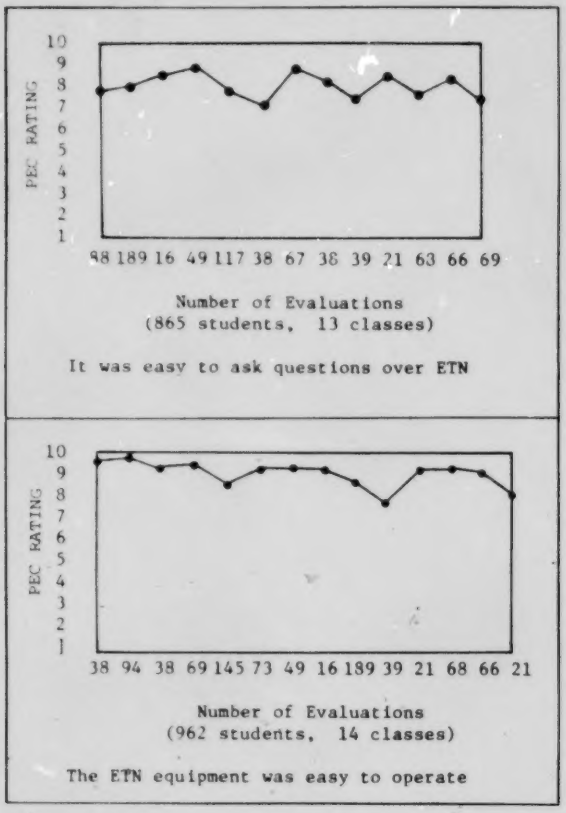
"I focus on talking to the audience just as if I were talking to them in person. People have told me that, for instance, an audience can hear the laughter in your voice or they know whether you're enthused or not, the way you come across on the microphone." (Nurses)

"I say immediately at the beginning of the program--'Sit back. . . relax. . . " (Beekeepers)

• Emphasizing the "Facilitation of Communication"

For many students new to ETN, the technical aspect (microphones and speaker) of this method of instruction may result in a need on the part of the instructor to emphasize a positive approach. It has been found that "automatic training" in the use of the equipment takes place with the repeated use of audio systems. In fact, frequent users soon become quite comfortable with the equipment and find distinct advantages in the "democracy" that microphone "access to the floor" provides. The following graphs illustrate that out of 865 and 926 students in 13 and 14 classes (1974-1975 program) who responded to the Program Evaluation

Checklist, a majority thought that the system was easy to operate and that questions were easy to ask over the system.



The "automatic training" which eventually takes place among audio systems users may not be present the first evening of class, however. It may be necessary, therefore, for the instructor to emphasize the ease of operation of the method, to demonstrate its use, and to stress that the group's cooperation in facilitating communication via this medium is important.

ETN Practice

Instructors encourage students to "experiment" in the use of the equipment by asking for random comments from students scattered across the state. They also encourage a feeling of contributions by students as being "mistake-free." Training sessions for local group leaders are often held using the ETN system. By working with the equipment themselves, the leaders learn how to help the students during the first ETN class.

> *"People sometimes tend to be reluctant because they don't know who the rest of the people in the 'class' are--so you have to give them encouragement to come on the system." (Vo-tech Teachers)*

> *"I start the program by saying, 'Hello, Mark Dokes from Rice Lake, how are you today, etc.'to encourage students to use the equipment." (Social Workers)*

> *Our participants have used the system for quite a while now--they are comfortable with the technology--that's why we get so many questions and so much involvement." (Physicians)*

• Developing Anticipatory "Set"

Since "air time" is a limited commodity, ETN programmers are aware of the importance of making the listening/learning situation as efficient as possible. One way of increasing listening comprehension is the establishment of a "set" on the part of the learner. A "set" may be thought of as an expectation on the part of the listener as to what is to come. One way of establishing this set is to use brief prefactory remarks preceding the listening, a kind of verbal "advance organizer." Brown explains that "good listening may require the ability to hypothesize to oneself: 'I imagine that what the speaker is trying to say is . . .'" This anticipating and comparing of expectation with outcome may cause the listener to pay attention to see if he is right.[4] Not only does an "expectation" or "set" result in higher scores on listening comprehension, but a favorable set results in recall of significantly more content than an unfavorable set.[5]

ETN Practice

How do ETN instructors provide for the creation of a favorable anticipatory set? Techniques used are not limited to simply the verbal advance organizer mentioned above, but range from pre ETN activities or "warm-up sessions," to preassigning readings so that students arrive for the program motivated by their own unanswered questions. The underlying theme of all programs is to develop them in such a way that they reach out to "where the learner is" in terms of interests and needs.

> *"Speakers should be very careful to let the audience know what they intend to 'cover' so students can follow the program process more easily." (Home Economics Teachers)*

• Creating a "One Group" Rapport

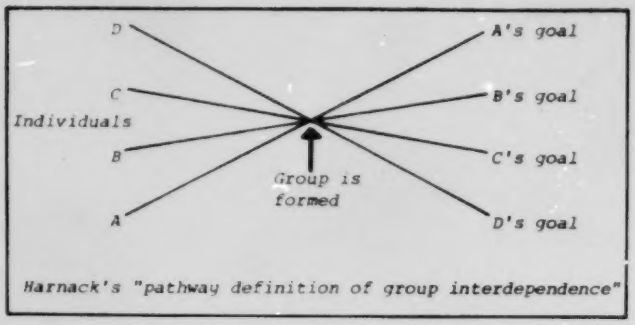
Creating a feeling of "one group" out of the scattered sites is a challenge for any ETN instructor because of the diversity of individual students and also because in many courses there may be only one or two students at some locations. Research in "group dynamics" and "interaction analysis" may shed some light on how "group identities" are formed. Some concepts that may be considered are: 1) a "group" is formed when individuals perceive a common goal and 2) an individual's involvement in a group will be secured when he perceives that his individual goals are somehow related to the goal/goals of the group, i.e., "complementary goals" lead to cooperation in a group.

A "Group" Is Formed When Individuals Perceive a Common Goal

Harnack's[6] "pathway definition of group interdependence" points out that one of the essential features of any group is that its members are dependent, to some extent at least, upon one another. "When individuals' paths toward their goals intersect, and when they become aware of this intersection, they possess the ingredients of a group." (See chart on following page.)

ETN Practice

Creating this "recognized goal" or goals within an ETN class is one of the challenges of ETN programming.



Harnack's "pathway definition of group interdependence"

One of the rules, rather than the exception of ETN classes is their diversity of students. Students are not only unalike in their backgrounds and experiences but may have different ultimate goals for taking an ETN course. Stressing the group goal—that of focusing on the content and experiences of the current situation, underscoring commonalities, and encouraging sharing to form a group "base" are important ways of developing a group awareness of a common goal orientation. The raster concept can provide a springboard for this technique.

"I try to plant seeds at the beginning--that part of the reason we're together on a statewide network is to be able to share ideas, share experiences, and that even failure is not 'fatal' and that it's 'okay' to talk about some of the things you would like to do differently or would like to be doing or projecting for the future. I find that by trying to emphasize this over time, that certain 'core groups' of people begin to feel more comfortable as the series goes on about sharing their activities." (Nurses)

"I always try to open the program by having a few people from around the state come in--so I will say, 'Is there someone in the north listening in or someone in the southeast.' And that way the statewide audience gets the feeling of excitement that they have this whole statewide group that's all sitting here together to hear the speaker and to contribute their own ideas." (Continuing Education for Women)

"We try to call on 'commonality,' that is, if we know we have two extended care facilities in the audience, then we will try to relate to what might be of concern to them during the discussion period."(Nurses)

"I don't ask an individual at one station to respond to a question--I ask it of the location. 'I'd like to have the people at Green Bay be ready to respond to this next week.' Now I know what happens then is that we go off the broadcast portion of our time and these people then sit down and say, 'He's going to ask something next week and we've got to have an answer, now what do you think it should be' and you have some group dialogue going." (Vo-tech Teachers)

"I had five or six students who came into the room where they had the ETN class in their free periods and worked together on their homework. They sort of 'taught' each other when I wasn't there--they did very well on their homework and on the exams." (Engineering Undergrads)

"I use a weekly quiz as an evaluation device and I ask that the quiz be done by the group, not individually. This encourages them to discuss the question with each person as a part of that discussion group. Each person signs it at the bottom and then they mail it back. Now this is a tremendous reading load if you have 40 stations but I find that it really does get the group to sit down and talk about the answers because I use this as part of their grading." (Vo-tech Teachers)

"All the 'learning' doesn't have to come through me--I like to step back occasionally and have one of the locations 'quiz' another location. For example, I might have LaCrosse present the material, and Madison function as the reactor group." (Adult Education)

Complementary Goals (Relating Individual Goals to Group Goals)

Complementary goals are set up in a situation in which the individuals can reach their respective goals only if all the members in the situation can reach theirs.[7] An "emphasis on cooperation rather than competition" is then developed.[8]

ETN Practice

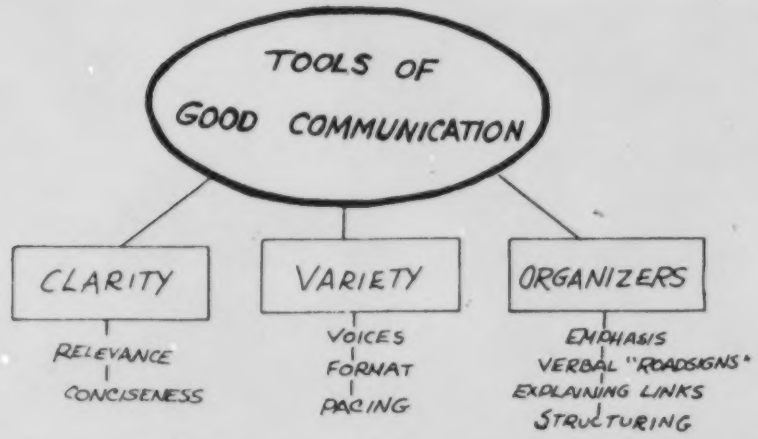
ETN instructors set up "complementary goals" wherever feasible and try to relate individuals' goals to those of the group. One of the most useful tools in relating individuals' goals to the group's is the roster. By drawing on "commonalities" and using "expertise" of individual members, each student feels he is an integral part of the learning group. Even "testing" situations can lead to complementary goals if the quiz is presented to the group as a whole. Group-to-group discussions can also develop this feeling of "complementary goals."

II. USING THE "TOOLS" OF GOOD COMMUNICATION

ETN instructors have as a general goal the ability to communicate as effectively as possible. Individual styles of presentation vary—and it is hard to "pin down" hard and fast rules for success. However, a look at some of the literature in "listenability," may point out some considerations. Listenability can be defined as the effect of style (the number, kind and arrangement of words of the message in the signal) upon the person receiving.[9] It expresses the comparative ease or difficulty with which spoken language can be comprehended. Some factors which may influence listenability are clarity, variety, and organizers. A brief discussion of each of these factors follows.

• Clarity of Presentation

Gage et al.'s[10] research on teaching methods shows that the ability of a teacher to be a good "explainer" correlates highly with students' comprehension scores. This variability (clarity) is still being refined by researchers but basically relates to the relevance and vagueness of an aural message.



Relevance. Relevance of a spoken message has to do with the directness of the material being presented, i. e., the elimination of digressions.[11] It is not the number of words per sentence that determines irrelevancy but the numbers of sentences that do not relate directly to the message itself.

Vagueness. Vagueness relates to the number of "indeterminate qualifiers" and "probability words." Indeterminate qualifiers are such words as *rather, very, any number of, more or less, little, few, some, pretty much* and *quite a bit*. Probability words are *could be, might, possibly, sometimes, more often than not, may, usually, likelihood* and *most of the time*.[12] An excessive proportion of qualification, haziness, and ambiguity leads to vagueness.[13]

ETN Practice

Successful programmers and guest speakers make concise, clear presentations.

> *"I feel a good presenter has conciseness and presents clearly the points in his material. 'Canned fog' doesn't go very far." (Clergy)*

• Variety in Presentation

Variety in communications is important. In presenting content, variety can be built into the program by changing the pace, using different voices, and varying format. Pacing can be varied through type of format in addition to using the guidelines that Beavers[16] suggests in the chart below.

VARIETY IN PACING*

Content	Fast	Med/fast	Medium	Slow
GREETINGS	▬▬▬			
OBJECTIVES	▬▬▬	▬▬▬	▬▬▬	▬▬▬
NEW CONCEPTS	▬▬▬	▬▬▬	▬▬▬	▬▬▬
DEFINITION	▬▬▬	▬▬▬	▬▬▬	▬▬▬
EXAMPLE	▬▬▬	▬▬▬	▬▬▬	
SUMMARY	▬▬▬	▬▬▬		

*Adapted from: A.V. Beavers, "A Case Study of Organizing for a Telelecture Course," The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, 1976.

Use of interview formats introduces variety. McKay,[14] writing about the use of telephone in university education, stated: "We found the best audience interest when at least two people took part in presenting the material." The interchange in an interview format helps develop spontaneity--a natural environment in which variety in pacing, inflection, and volume can develop. Rookey[15] also stresses a natural delivery. He suggests: "Don't read the material. Nothing is worse than someone reading even the most carefully prepared lesson . . . because the voice flattens and becomes monotonous."

ETN Practice

ETN programmers plan for and carry out this communication technique of "variety" in a number of ways: 1) variety in voices, 2) variety in pacing of delivery and length of segments. Most instructors make a conscious effort to improve the variety in their own voices by varying pitch, volume, and using "verbal punctuations" (pauses, etc.) for emphasis. Natural, spontaneous delivery helps to develop this quality. Use of a variety of formats such as discussion, question-and-answer periods, role playing, and panels takes advantage of a variety in voices. Pacing by presenting "learning chunks" in shorter segments has been previously discussed.

> *"When I ask people to be on ETN, I frequently deliberately do it by telephone so I can judge their voice, and for a number of people--I'm sure they'd be able, with just a little bit of conscious effort to make their voices more interesting. I think a person's voice quality is most important if they are a single lecturer--when it's a panel there isn't so much of a problem. Although I use panels a great deal, I still would not hesitate to use a single person doing a lecture if this person is a very dynamic lecturer." (Continuing Education for Women)*

> *"I have a course which runs for 90 minutes--obviously you can't feed presentation lecture out for 90 minutes--so I use interviews, panels, etc. to break up the listening." (Vo-tech Teachers)*

• Concurrent Organizers

What are concurrent organizers? In a print medium, concurrent organizers can be described as "the underlining or italicizing of key words of entire sentences."[17] The underlining or "isolation effect" is thought to provide conceptual "pegs" around which the materials can be organized.[18] Listening studies also point to the usefulness of "setting off" the material to emphasize central ideas. For example, although research does not show that the overall "organization" of aural messages is important as related to learning effectiveness,[19] studies have shown that listeners who perceive the central ideas and organization scored better in comprehension.[20] Some of the ways that the speaker can facilitate perception by the listener of important ideas are 1) the isolation of the important ideas from supplementary ideas and 2) the structuring of ideas within the lecture by using verbal "road-signs" and other devices. A few of these concurrent organizing techniques will be described.

Emphasis on Important Points. Verbally drawing attention to a point being made and emphasizing that it is important to remember does seem to help the listener. For example, Irvin[21] states that "when a speaker says that a point is important, about 80% of the students will remember it. Both Jersild and Ehrenberger[22] found that speakers using phrases like "now, get this" resulted in higher comprehension by subjects. Emphasis on main points seems to create the "isolation effect" as described above.

Verbal Road Signs. Announcing at the beginning of a message how you are going to develop it is called a verbal "road sign" by Harnack.[23] An example of a "road sign" is to say: "Let me offer one example," or "For instance, I see three reasons why . . ." This is a simple method for the speaker to set the bounds of his own message—alerting the listener as to what is coming and how it is expected to arrive.

Explaining Links. In one study, greater use of explaining links by lecturers were related to higher comprehension scores. Explaining links are words, phrases such as because, in order to, if, then, consequently, by means of.[24] Again, these words tend to "set off" or "isolate" the sentence or idea that is to follow.

Rule-Example-Rule Pattern (Structuring Statements). One study showed that a structuring statement is more effective than either an inductive or deductive pattern of explanation. A structuring statement consists of the use of a summarizing rule twice—both before and after a series of examples. High scoring lecturers would begin with a general statement, use a number of examples supporting that statement and then restate the original rule, using sentences such as "So you can see that." In contrast, less effective lecturers used only one summary statement, usually before the series of examples.[25]

ETN Practice

The use of verbal concurrent organizers is important to ETN instructors; it is probably more spontaneous than preplanned. The most structured use of a concurrent organizer in an ETN program is that of "tying" the message directly to a printed outline—such as the "topic outline" previously described.

> *"I have found that how the presenter organizes his material in presenting it is a key to how well he is received. For example, a good presenter will say: 'My first point is . . .' or 'These are the five principles . . . one . . .'" (Clergy)*

> *"I use a topic outline--it helps the students to know exactly what part of the lesson you're dealing with at each particular moment. I always keep in mind that the students are going to need all the structure I can provide." (Vo-tech Teachers)*

III. GROUP DISCUSSION AND PARTICIPATION

Group discussion is an important facet in ETN programming. As an integral part of almost every other teaching technique, it is used for clarification, feedback, and summarizing, as well as problem-solving. Because of its role in the learning process, ETN programmers have made concerted efforts to develop approaches which lead to a free flow of discussion among the many scattered ETN locations.

Unfortunately direct research on techniques for stimulating discussion (or communication among terminals) in a telephone-based system is lacking; the one exception being that of the "raster concept" which has been discussed previously. The adaptation of the raster concept to the tool used by ETN instructors—that of a location roster—has been extremely helpful in approaching discussion sessions.

One other implication from research on groups, although not telephone-based, is that of the need for "structure." Within an audio system such as ETN, structure during group discussion may be necessary for several reasons: the size of the group among others.

• The Larger the Group the More the Need for "Structure"[26]

Bales[27] points out that all groups seem to need some type of "structuring." Structuring probably grows out of the need to reduce the "tensions growing out of uncertainty and unpredictability in the actions of others."[28] In larger groups, for interaction to take place, the sheer complexity of relationships calls out for more centralized structuring. "Genuine leaderless discussion seems unlikely to occur save in small, mature groups."[29] It is important, then, for the leader to do some structuring of the discussion if the group is large. The goal of the leader is to provide for the opportunity to participate, not to provide for balanced participation,[30] i.e., not everyone needs to say something but the opportunity should be there, if it is desired.

• Discussion Doesn't Always "Just Happen" over the ETN System

Another reason that structure during group discussion is desirable is that although many students "wish" to participate, they may not in fact wish to be the first ones to "break the ice." Therefore, many ETN instructors feel that "pump priming" activities are necessary and feel justified in structuring discussions by "planting questions" (calling ahead to ask certain individuals to be responsible for asking questions), preassigning feedback (assigning a group location or individuals to react to the presentation or to assigned questions), using directive questioning techniques (relating to an individual or location and directing the question to them). The underlying philosophy is that not only are these "pump priming" activities a legitimate part of ETN programming but

that they actually perform the function of seeing that the important material is "brought out."

- Some General Discussion Guidelines

Keeping the idea of structuring as an important basis of ETN discussions, faculty have incorporated a number of ways to secure involvement on the part of their students. The creation of a "climate" in which everyone feels a part of the group and the developing of a spirit of cooperation by relating individual goals to those of the group have been previously discussed. Instructors or discussion leaders are also sensitive to attempts by students to enter the discussion and actively encourage them. They are also alert to potential areas of confusion, in the subject matter presented either by guest lecturers or they, themselves. Other general suggestions found in the literature on "discussion techniques" may have general applicability to telephone-based instruction. For example:

Rephrasing or Restatement. Rephrasing the contribution of others "consists of putting another's idea into a different set of words."[31] This technique is an excellent method of "feedback." It is also a way of showing the listener that you are really listening, which is important to the individual's feeling of importance. Which statements should be rephrased by the discussion leader:

1. Those which are unclear to some members
2. Those which are central to the discussion.[32]

This technique is very relevant to audio systems where feedback is most desirable; it also utilizes repetition which may be most important if a student's transmission is not clear to the rest of the group (perhaps because of not speaking directly into the mike).

"Bridging" Technique. Members of a discussion must see the "bridge" between what is being said and what has been said. Discussion leaders can help "bridge" this gap by the technique of simply making a transitional comment between contributions.[33] For example, if the person who has just finished speaking has suggested one way of solving the problem, you might begin like this: "John has just suggested one way of solving the problem . . ." Bridging in an audio system may not only help in continuity, but if the discussion leader repeats the individual's name, it may lend to personalization also.

Summarizing Technique. This technique may help bring reticent individuals into the discussion. It consists of a comment which summarizes such as "Before we go on, I want to make sure that we have heard all the ideas that people may have. Some of us haven't had a chance to say much, and may have some ideas that haven't occurred to others. Let's summarize the ground we've been over and then see if anyone has anything to add."[34]

Participation and Involvement by the Leader. Member involvement is much easier to obtain when the leader himself is involved.[35] The effective discussion leader is one who is stimulated by the discussion himself without losing sight of the "process" function he is expected to perform. In other words, although the discussion leader needs to communicate his enthusiasm, he must be careful about offering conclusions or solutions. He can instead "offer evidence, suggest hypotheses, and stimulate thought and research."[36]

Summarizing the general guidelines for discussion:

1) Emphasizing Members' Contributions. Make sure each member perceives his importance to the group's goals.
2) Opportunity to Participate. Proper regulation of group so that a few members do not dominate the discussion. This may involve dividing into "buzz groups."
3) Relating Individual Goals to Group Goals. Individuals need to have group goals defined and related to their own.
4) Listening Empathetically. The very act of listening convinces members that both they and their contribution are important. Using restatement (or rephrasing of the contribution) is a way to convey this feeling.
5) Accepting Contributions Without Evaluation. The leader must help every group member to feel that he has a right to make his contribution and have it accepted for serious consideration. "Nothing will cool the eagerness of a discussant more rapidly than having his contribution ignored or summarily dismissed."
6) Be Stimulated Yourself. Member involvement is directly correlated to the leader's involvement and enthusiasm.

- Suggestions for Stimulating ETN Discussions from ETN Practice

Planting Questions. In seminar type programs, ask for some individual to be responsible for coming in with questions if the discussion lags.

Directive Questions ("Linking up" with student backgrounds). Identify students using location roster who are apt to be knowledgeable about the topic and direct questioning directly to them.

"Jumping-off" Questions. Lead up to your question with some sort of rationale or "jumping-off" point and let the discussion begin with that, instead of just throwing out a question "cold," i.e., an over-all "umbrella-type" question receives weak response.

Assigning Feedback. Involve individual or group prior to the program by assigning responsibility for feedback to certain questions.

Study Questions and Syllabus Material. Use a list of study questions or an "assigned reading" in the syllabus as the basis for stimulating discussion for the next program.

Create an Open, Sharing Atmosphere. Plant "seeds" that the class is here to share. Stimulate and encourage every student to contribute.

Design in Issues, Problem-solving (Pump Priming" Activities. Design for problems that are relevant to specific learners' situations to stimulate various viewpoints. Use role-playing, case studies, and panels to encourage interaction.

Divide Groups into Smaller Units ("Buzz Groups"). To allow for more individual participation, divide large numbers at sites into small groups for discussion.

Call on Commonalities. Ask group or individual with specific interest in topic to comment or give opinion.

Group-to-group Discussions. Assigning responsibility to an ETN location to actually lead the discussion from that site creates total group involvement.

> *"I have 'primed' a few people before the series begins to enter in with questions. I talk to people in advance and indicate*

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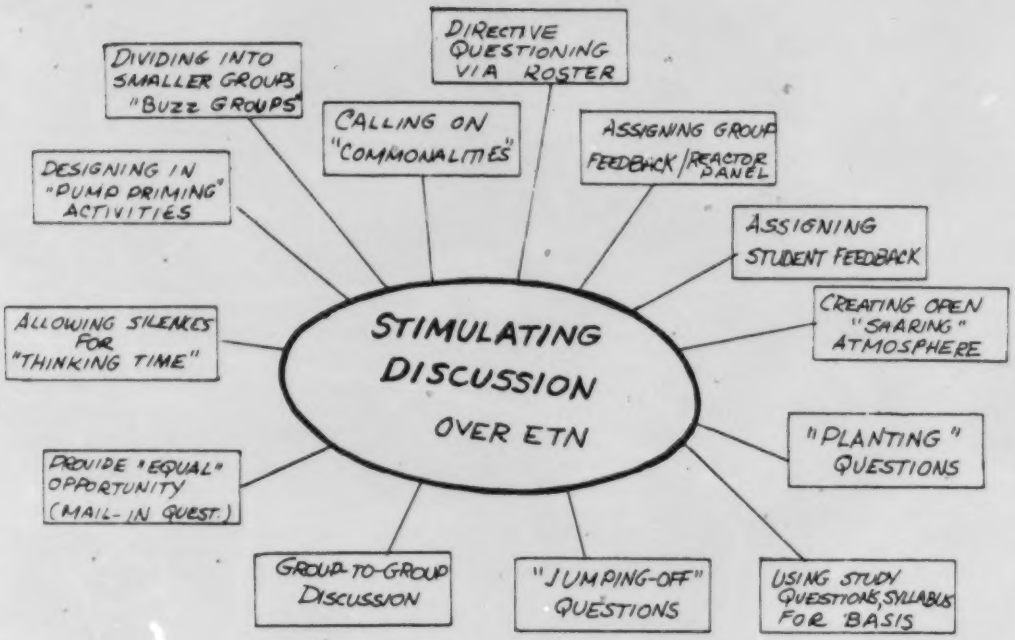


to them that if questioning does lag, that they come in with some questions. I think this is a legitimate technique." (Music Teachers)

"By having in front of me the names of the people and what they do, I can relate my question to their occupation or interest area. For example, I will say, 'You're engaged in this activity (apprenticeship)--what do you think about this?' The old 'umbrella' question where you just kind of throw it out over everybody and wait for something to happen doesn't function very well--you have to be a bit more directive." (Vo-tech Teachers)

"If you can always lead up to your questions with some sort of rationale--that brings a response. What I call a 'jumping-off' question." (Vo-tech Teachers)

"If an open-ended question gets no response, I will say--after waiting a time for the audience to ponder alternatives-- 'Perhaps you've chosen not to answer my question--well, I'll offer you a few alternatives--toss this around. . .' This technique of saying something two or three different ways tends to stimulate response." (Nurses)

"We have not found much lag in discussion. This could be partly the information sent out in the mail--which probably brings up a lot of questions." (Nurses)

• Dealing with Silences

A "silent period" in an ETN discussion or question-and-answer period is a situation that most instructors must deal with at one time or another. Generally programs that are fast-moving with much content do not have many "silent periods" but developing techniques for, or a philosophy about, the silences that may sometimes occur seems to be basic to most programmers. In discussion sessions, students are involved in a "double role complexity,"[37] i.e., they are decoding others' messages while trying to encode their own. Thus many "silences" are purposeful and in describing "teledis-cussion" at Kent State, Heiliger[38] made it clear that "many pauses are necessary."

If these "necessary pauses" do not panic an instructor, then the additional time allowed students may reflect in better responses. For example, one study in questioning techniques showed that when a teacher waited 5 seconds for a student's response rather than 1 second, the response was longer and more thoughtful.[39] (Note: Five seconds can seem like a "long" silence.) Hudgins[40] points out that a deliberate effort must be made to allow a class "a reasonable period of time in which to construct responses to questions. It would seem that this interval should somehow increase with the complexity of the desired answer and with the independence of the answer from any formal preparation the student may have been asked to make."[41]

ETN Practice

ETN programmers try not to be panicked by silences. Silence in question-and-answer periods will probably not need to be as long as those allowed in discussion periods where problem-solving or creative thinking is going on. During times of discussion, ETN instructors may allow as much as 2-3 minutes for silent "thinking time."

"By giving the students some 'silence,' hopefully we are giving them time to structure a question in their minds." (Nurses)

"I think I found that I adapted to the silences with time. I realized that while I was in the studio alone--the learner was sitting with a group--or at least

another colleague--and what's happening off mike is that they're discussing the content they've been exposed to. They may even be discussing their own questions, their own ideas that relate to their own agency." (Nurses)

"I find that speakers who are relatively new to ETN may tend to 'jump in,' to break up the silence. We try to warn our speakers of this and ask them to hold off--for a long silence--maybe 2 to 3 minutes. That seems like a long time on the air. I found it difficult at first to last even a minute, but now I think that we do allow people that time--having the trust that they're probably discussing on their own." (Nurses)

"I try not to be panicked by silence--I try to let a little time go by after I say, 'Are there any more questions?' Sometimes I'll try to make a statement so I give people time to ask the next question." (Continuing Education for Women)

"It's kind of an interesting pattern--if there is total silence on the circuit and the moderator shoots in a question, two or three will follow right away. And then maybe it'll just go silent again and he'll have to ask another question." (Physicians)

IV. FOSTERING PERSONALIZATION

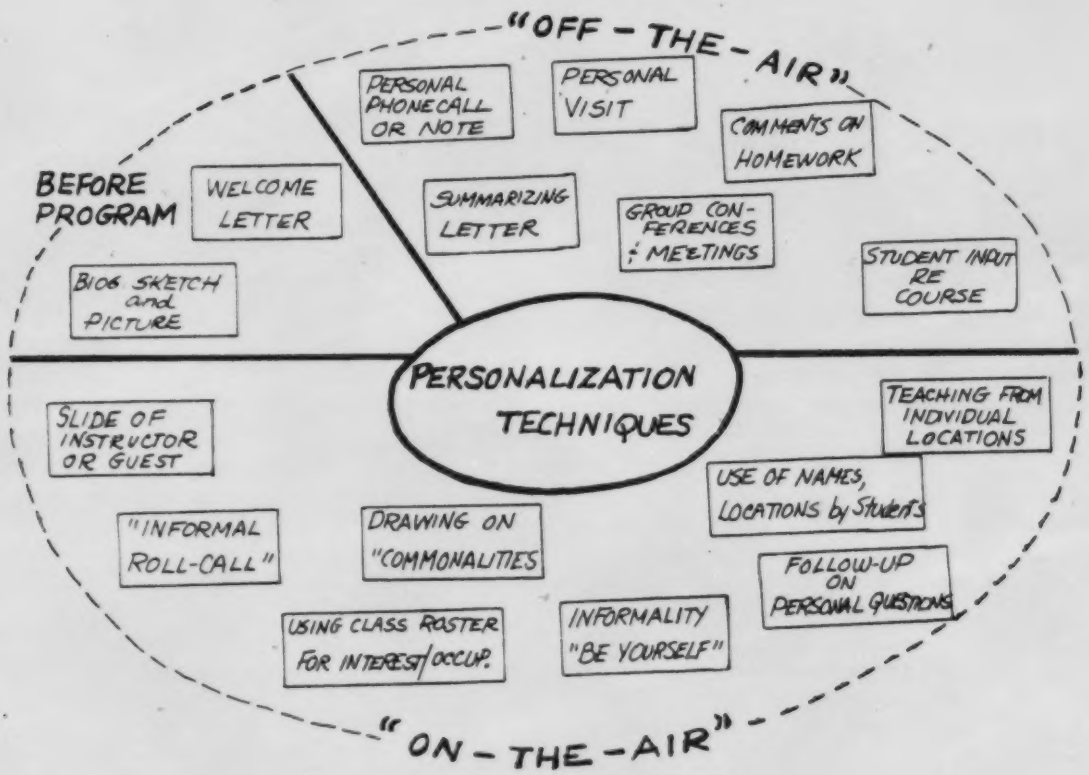
• Prior to Program Time

By the time the ETN instructor is ready to begin the first program, some of the "personalization" techniques that were designed into the program have already reached the individual students. Such previously discussed items as a "welcome letter," a biographical sketch of the instructor or guest lecturer with an attached picture, have already given the student a more "humanized" approach to the upcoming course. Carrying through this "personalization" is, of course, a goal. How is personalization accomplished during the actual program?

• Personalizing "On-the-Air"

Using the Class "Roster." One of the basic tools that is used for fostering personalization is the "roster." The roster helps the instructor use personal names when "calling on" various students in the class.

> *"When I receive the students' personal information cards, I arrange them on a sheet by ETN location--the names of the people there and perhaps a line or two about what they do. I can ask an individual person at a location to make a response to a question. I think that helps because they don't feel they're*



out there as an isolated non-entity. They are identified and we try to reach them occasionally. (Vo-tech Teachers)

"To start the program I would say,'Hello, Mark Dokes from Rice Lake, how are you today--and is it a nice day there'--going through the roster and doing that a few times." (Social Workers)

Emphasizing Use of Names, Locations. Individuals who initiate discussion are encouraged to give their names and location when speaking. Moderators of programs that meet only once or twice (and where roster information may not be available) are also aware that the audience wants to know who is speaking. One moderator always introduces the program by using her first name and then constantly repeats it during the program so that others will use it, too.

"I find that over time people will begin calling me by first name. I constantly use my name as I introduce the program so that people know me by first name." (Nurses)

"Over the years I have had contact with our clientele group throughout the state, and so as a result I am able to call people individually by name and many on a first name basis. I use that first name basis whenever possible to encourage discussion and to encourage the classroom type of group situation." (Music Teachers)

"I always try to repeat several times in the course of a class that when they call in with a question that they should state their county names and say something like 'Green Bay calling--or Ashland calling.'" (Continuing Education for Women)

Drawing on Commonalities. One of the most frequently used ways of personalizing is to call upon "commonalities" within the group. For example, if during a program, there are several groups in the audience with specific expertise or concern in a certain area, they might be called on to share their information with the rest of the group.

"Let's say we're talking about apprenticeship and I know from my roster that there are 5 or 6 people out there who either work with an apprentice or who are associated with apprenticeship occupations, then the thing to do is to go to those people and say 'What do you think about this --you're engaged in this activity . . . '" (Vo-tech Teachers)

Informal Roll Call. In general, ETN instructors feel that to "call the roll" for the entire state uses up precious time that could be used for learning. But taking a short, informal roll call does add to the feeling that there are others at the various locations who are sharing in this personal experience. It's easy to just ask for response from a few locations—and this response generates excitement that there is a statewide "class," not just isolated individuals.

"I use an informal roll call of just a few locations to give the feeling that we're all here together to hear the speaker and to contribute our ideas--it give the statewide audience the feeling of excitement." (Continuing Education for Women)

Follow-up on Students' Questions. The importance of ongoing communication with students is an essential concept for ETN instructors. By emphasizing to the student that his/her question is important, the feeling of being just another individual "out there" is minimized. Instructors make sure that they reinforce the idea that any question not answered during the program time will receive a reply, either by a personal phone call or some form of mailed communication. Students can mail in questions not answered during the program via postcard or an "ETN-O-GRAM" (postage paid mailer).

"I find that sometimes I want to get in touch with them by phone. If they raise a question and I want to go at some length on a point--I'll say, 'Fine, I'll call you tomorrow,' and this gives me a chance to touch base with some of the students who may have a concern." (Vo-tech Teachers)

"I stress that 'If you have a question and find that you did not have time to ask it, then feel free to send this question in, and I'll get an answer for you." (Beekeepers)

"I think it's important to tell people that if they can't get their question in during program time, to write the question and you will try to answer it the next time or send them an answer by postcard. I think that gives people a feeling that even if the ETN line isn't always available to them--they do have contact that way." (Continuing Education for Women)

Informality—"Being Yourself." Each individual instructor has his own style and "personalities" do seem to come across the ETN system remarkably well. Not everyone feels at home with an "informal" style but one of the ways to make the program have an air of informality is to "visualize" projecting this type of atmosphere. For example, one moderator who conducted many successful panel programs, visualized herself as a "hostess" for the group and saw her role as that of making the group "feel at home."

"I've tried to act almost as a 'hostess' for the group. I'd say, 'I'm _____ in Madison. We're sitting here on a lovely fall day--people are a little late arriving so maybe you'll hear a little noise in the background.' I try to 'lay the scene' and give them the feeling that I'm here to make sure that this presentation has some continuity." (Continuing Education for Women)

Teaching from Other Locations. Descriptive studies of other telephone-based instructional systems point out the value of personal visits to get acquainted with the "class." ETN instructors who have classes which continue for any length of time (more than 1 or 2 sessions per month) find it both helpful and satisfying personally to teach from locations other than their "home base." This flexibility of the ETN system allows instructors to combine personal visits to students (which usually result in helpful counseling sessions) with teaching responsibilities.

"When I make personal visits to my students at other locations, I run the broadcast from the location. One of the reasons why I like to do this is that I can be with at least part of the group for the ETN program." (Vo-tech Teachers)

- "Off-the-air" Personalization Techniques

Personal Visits. Personal visits are considered important in telephone-based instructional programs. Descriptive studies of other systems have pointed out the value of personal visits by instructors.[42,43,44] As previously described, these visits may be combined with actual ETN broadcasts from the various sites. However, "informal" visits are also made by instructors if other business takes them into a certain area of the state. An important function of the personal visit is that it allows for student feedback, and many times it is used to resolve individual concerns.

"I try to visit my students at least once a semester (even with locations from La Crosse to Waukesha to Marinette). When there's a faculty meeting or other reason to be away from Wausau, I try to work in a visit to the campus at the same time. Usually it's a Saturday or Sunday--I either visit my students at home or at work." (Engineering Undergrads)

"The best thing is to try to get to locations within the first few weeks, if you can. In the course I'm teaching we try to cluster every 3, 4 or 5 weeks, depending on how many clusters we have to make." (Vo-tech Teachers)

"When I go to a location, I run the broadcast from the location and will stay an extra 2 hours or so talking about things (with the students). My feeling is that you almost have to be out there at least every 5 weeks or so--that would be the least you could see these people. They have to have contact with the instructor in some way." (Vo-tech Teachers)

Personal Phone Calls and Letters. The use of personal phone calls and letters was mentioned in the section on "on-the-air" techniques. An additional source of making the course more personal for the students is their ability to have "input" into the course itself—regarding content and process. Some of the techniques used for this "input" will be discussed in the section on Feedback such as the "ETN-O-GRAM" and weekly evaluations.

Summarizing Letter. Just as a "welcome letter" before the first program develops a rapport between the individual and the ETN instructor, a "summarizing letter" can establish contact between programs. It is simply a summary of the "learning" from the program just presented.

"During the program you may not have time to 'tie' everything together. So that's my job. I send each person a letter (it was simply run off on a copy machine) saying 'Here's what I as an individual got out of the presentation (panel, role playing, etc.) the other evening.' It's my way of humanizing and individualizing that instruction." (Social Workers)

"Tailoring" Assignments to Individual. Assignments of projects can be directed towards individual interests. Focusing on personal occupational concerns is a way of saying to the individual student, "even though you're one of 300 students, your own viewpoint matters."

"The projects were on an individual basis--so that they could be tailored to the individual's job or function within an agency. It was to develop answers to questions like 'How can you improve your situation in your agency.'" (Social Workers)

Comments on Individual Homework. In a credit course involving technical subject matter, one ETN instructor finds that he reaches individuals on a personal basis by collecting homework regularly and making written comments regarding individual student's problem areas.

"I collect homework on a regular basis. I think it's really necessary to see exactly what kind of work the student is doing and to communicate by mail." (Engineering Undergrads)

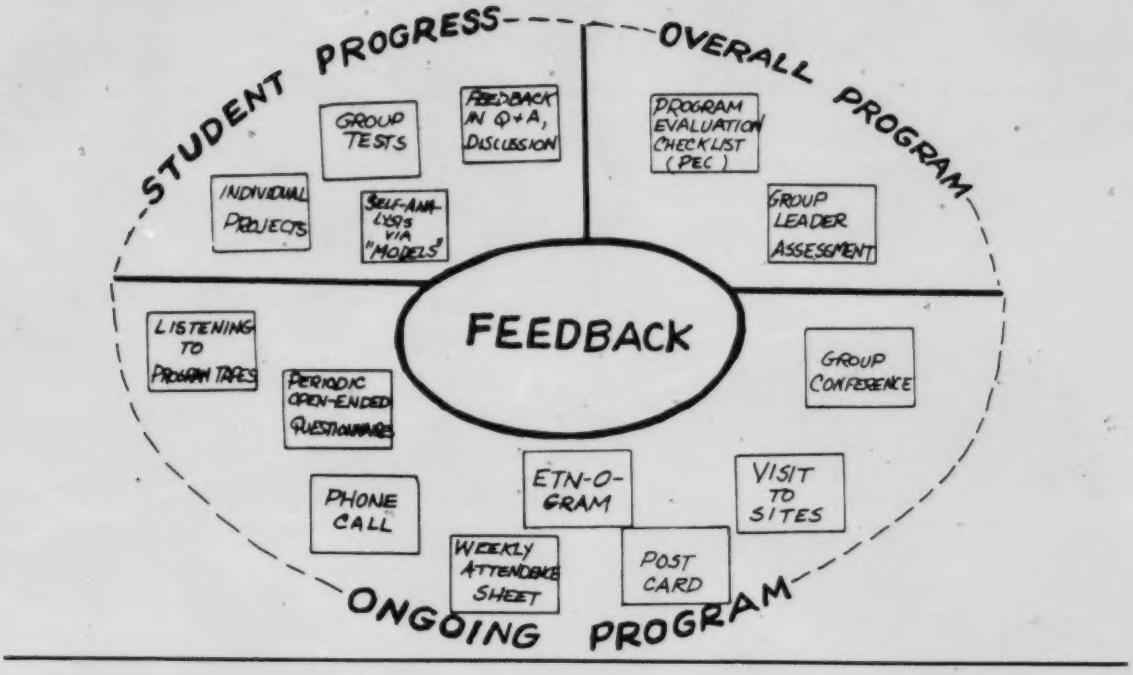
Group Meetings—Face-to-face Conferences. In courses which meet regularly over a semester, instructors have organized face-to-face meetings in a variety of settings. For example, one successful meeting of this type was the one combined with a convention of the Wisconsin Teachers Education Conference and which allowed music teachers from throughout the state to meet in a group setting. Another approach is to divide the state into "thirds" or "halves" and invite participants to drive to a central location for a Saturday or evening meeting. Some courses which have successfully engineered face-to-face meetings are in "Career Education," "The School and the Law," "Music and the Exceptional Child," and "Issues in Vocational and Technical Education."

Feedback

The feedback process is the final link in the communications "loop." It is the way in which the recipient of the message can give the sender information about the way the message was received and enables the sender to make any corrections, additions or explanations necessary for complete understanding. It may even help to "improve the encoding and transmission process."[1]

ETN Practice

Feedback in ETN programs is important in at least three areas: 1) Student/instructor feedback, 2) Feedback to the instructor regarding the ongoing program and 3) Feedback on the overall program. How are these types of feedback accomplished? ETN programmers have developed a variety of ways to assist in this process.



I. STUDENT/INSTRUCTOR FEEDBACK

Both instructors and students need and want to know if the "message" is being received and understood correctly. Some of the ways in which feedback in this area can be achieved are: informally through question-and-answer or discussion periods, more formally through the use of group tests or individual projects, and by using student self-appraisal devices such as "models."

• Feedback Through Informal Q&A/Discussion Periods

One of the ways an adult can gain feedback during the learning process is through the informal methods of question-and-answer/discussion periods. These techniques are valuable because they provide a form of immediate feedback to the learners as to their own understanding of the content material. Allowing for opportunities to respond, to ask questions for clarification, and times for possible disagreement helps to assure that the "message" has been received and understood. ETN programmers plan for these interactive segments and consider them an important part of any program.

"We are very 'protective' about our discussion periods because we feel they are so valuable . . . " (Physicians)

• Group Tests

Another method for students to gain feedback is the "group test" which allows for both self-appraisal and feedback from the instructor. Students work in groups, discussing the answers among themselves and then turning in a product representing a cooperative effort. By working in a small group, an individual can see where he is in his learning as compared with his peers, and emphasis is placed on clearing up any misunderstandings he may have. One instructor used the "group test" on a weekly basis as a "check" on communications between himself and his students.

"I use a weekly quiz as a feedback device and it is done on a 'group' basis--it gets the group to interact." (Vo-tech Teachers)

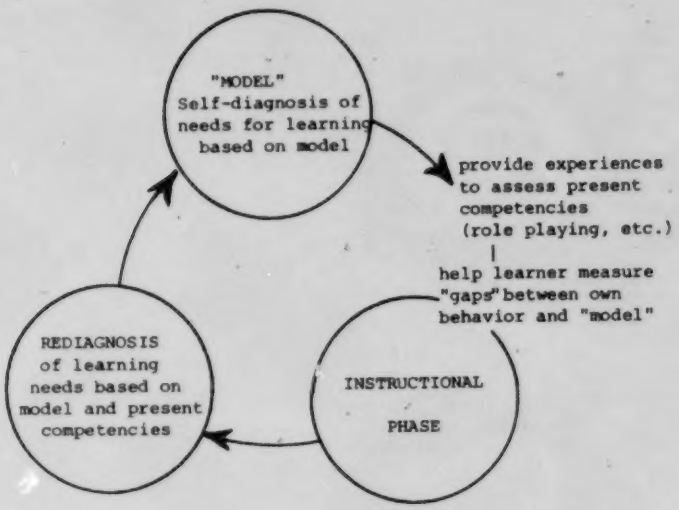
• Individual Projects

Another way for an instructor to gain insight into how well he is "communicating" and for the student to gauge his understandings is to assign an individual student report or project. The student writes a self-analysis of how he is handling a current concern based on knowledge or understandings gained from the course. Both student and instructor can gain feedback using this technique. These reports can also serve as the basis for an interactive type of "feedback" over ETN by allowing short, 5 minute reports by students.

• Student Feedback Using "Models"

Adults are "self-directed" in terms of determining needs and in terms of diagnosing whether those needs are being met, according to Knowles.[2] This self-diagnosis concept centers around the adult becoming aware of "gaps" between his own behavior and that of a "model" presented to him or "built" by the group. The model consists of the competencies or characteristics required to achieve a given ideal of performance so that the learner has some vision of the 'good' supervisor, the 'good' public speaker, the 'good' parent and the like—and of the competencies required to become 'good.'[3] The learning cycle then consists of 1) student diagnosis of learning needs based on a model, 2) the instructional phase, and 3) the rediagnosis phase. During this cycle, the instructor can help the adult learner by presenting these "models" and then facilitating feedback to the student regarding his own competencies.

Presenting the "model." ETN instructors present "models" or levels of competency which facilitate the learner's own self diagnosis of his/her learning needs


"MODEL"
Self-diagnosis of needs for learning based on model
provide experiences to assess present competencies (role playing, etc.)
help learner measure "gaps" between own behavior and "model"
INSTRUCTIONAL PHASE
REDIAGNOSIS of learning needs based on model and present competencies

Adapted from: Knowles, M. S. The Modern Practice of Adult Education. New York: Association Press, 1970.

through the use of written materials, celebrity interviews, case studies, and role playing.

> *"'Models' in the form of stories illustrating certain themes were distributed as handouts or read over ETN. Students could then compare their own level of competency with that of an 'ideal.'" (Article Writing for Fun and Profit)*

> *"Celebrity expertise interviews and actual slides of works by these professionals helped to stimulate learner 'measurement' of gaps between the ideals and their own level of competency." (Photographic Masters)*

> *"In learning how to care for patients with cancer, case studies were presented by various students as to proper approaches for nurses in dealing with this illness." (Involving the Patient with Cancer in Your Care)*

Providing Feedback Regarding Model. Techniques used to provide opportunity for feedback regarding the learner's level of competency include written comments on assignments, study questions, and summarizing feedback via the Program Evaluation Checklist and self-appraisal statements.

> *"In an article writing class, instructors gave written feedback to students on the quality of their papers." (Article Writing for Fun and Profit)*

> *"I use a list of study questions that go with a particular topic. I try to have 12-15 questions that I think the students should be able to answer from the readings or from the discussion presentations we anticipate in the session. This gives them additional guidance--they are able to sense what kind of questions they should be able to answer as a result of the readings and the session that has just been presented." (Vo-tech Teachers)*

> *"In an adult education class, students reviewed, during the last class session, statements they had written at the beginning of the semester regarding their own learning objectives. This last session provided feedback and a chance for rediagnosis of learning needs." (Adult Education)*

> *"The Program Evaluation Checklist (PEC) contains 'content questions' designed to stimulate a student's own appraisal of how well his own learning needs were met, providing feedback on current levels of competencies. For example, some questions specific to certain subject matter areas are:*
> *Accounting: 'I am now more able to establish my goals with regard to inventory and/or receivable control.'*
> *Education: 'I feel more confident in dealing with discipline problems as a result of this series.'*
> *Clergy: 'As a result of this course I can respond more intelligently to problems and issues faced in this area of study.'*
> *Music: 'I now understand harmony better.'*
> *Advertising: 'The course caused me to reevaluate the procedures I currently use in my commercial applications of advertising.'*

II. FEEDBACK REGARDING ONGOING PROGRAM

An ETN instructor needs feedback regarding the program on an ongoing basis to assess the strengths and weaknesses of the "encoding and transmission process." As the course evolves, it is important to answer such questions as:

- Are the course objectives in line with the educational needs of the students?
- Is the content at the appropriate level in relation to the experiences of the students?
- Is the pacing too rapid or too slow?
- Is there enough time for interaction?
- Are any technical problems developing with visuals or equipment?
- What is the "happiness index" of the classes?

There are various ways ETN instructors use to encourage or facilitate ongoing feedback. Some involve feedback by the students themselves such as the "ETN-O-GRAM" and postal cards; some involve the instructor's own self-analysis such as listening to and critiquing tapes of previous programs.

• Feedback from Local Sites

"We ask each station to write back comments that they might have. We tabluate those and provide a copy to the speaker so that he'll know what the audience reaction was--a very crude, very general thing, but it is helpful in a way: it tells us generally the 'happiness index' of our people from week to week, it tells us what speakers we maybe shouldn't have back next year and it tells the speaker that maybe he'd better give a little more attention to this lecture next time. Some of the comments get very specific as to why they didn't like it. They can write whatever they want--sometimes it's 'lousy slides this week' or 'best lecture of the year' or it can be a very specific suggestion or comment." (Physicians)

"The ETN-O-GRAM is an 8 1/2 x 11 postage-prepaid mailer which allows students to write down any comments or questions they might have."

"A check can be made periodically during the course by having students respond to an open-ended item such as 'My general reaction to this class and the technique by which it is being taught . . '" (Home Economics Teachers)

• Listening to Tapes

Instructors gain insight into the program progress by listening to tapes of previous programs—this affords the opportunity to sit back and really "listen" to what has transpired during the class. Tapes of the programs are available for this "listening" practice and instructors find this an invaluable tool for feedback.

"We listen to tapes of previous programs and analyze what happened. As a result we are building on our experiences." (Music Teachers)

• Phone Calls

Many instructors make periodic phone calls to students in their classes to "check out" how the program is progressing towards its objectives. This informal method of feedback is useful in personalizing the experience also. (See "Personalization.")

• Visiting Sites

By teaching ETN classes from various locations around the state, the instructor can meet with his students and find out much information about their views about the course. Students from nearby locations are encouraged to drive in for these occasions. (See "Personalization.")

• Face-to-Face Group Conferences

Group conferences are not only an extremely effective way of "personalizing" the experience but serve the function of providing feedback to both instructor and students. (See "Personalization.")

III. FEEDBACK REGARDING OVERALL PROGRAM

• Program Evaluation Checklist

ETN programmers gain input from students regarding the overall program by using the Program Evaluation Checklist (PEC). This checklist provides feedback on how well communication and program objectives were met. Designed around six basic aspects of the program (program content, organization, materials, lecturer, physical facilities and technical quality) the PEC is a list of statements which are student-rated. Individuals use a numerical scale to describe how well they feel each statement matches their own experience. Demographic questions are also included to gain "profile information" about each student.

Computerized printouts allow instructors to gain feedback about the overall program, both from the standpoint of general satisfaction and in regard to specific details. Program strengths and weaknesses become apparent with the result that the PEC becomes a valuable tool for future planning.

"We build items into the PEC which indicate "interaction capability"--was it there and did they take advantage of it. . . " (Social Workers)

"We write a summary report each year based on the evaluations--this is how we initiated the pre-class activities and were able to arrive at some of our own 'built-in' activities." (Nurses)

"We found from evaluating the series that clergy have a variety of interests--on the basis of this information, we are planning additional programs ranging from 1 hour to perhaps 5 to 7 hours." (Clergy)

• Local Group Leader Assessment

Another way of obtaining input as to the overall program is to meet via ETN with local group leaders. Several months after an ETN program has concluded, a meeting on the network is scheduled to share the results of the PEC and other informal feedback. Each site leader has input into this meeting which facilitates the planning of future programming.

Summary

What are some of the general guidelines which might be applied when designing programs for a telephone-based system such as ETN?

1) Short Listening Segments

Learning segments should preferably be short periods (10-15 minutes) alternated with other types of formats. The length of any one unbroken listening period should probably not exceed 25 minutes. Such techniques as question-and-answer periods or problem-solving discussion can be used to segment long stretches of listening.

2) Simplification of Presentation

Complex material presented too quickly tends to "overload" any media channel, including telephone-based instruction. New ideas or complex ones may need slower pacing or more examples than a review session, for example. The channel capacity can be "expanded" by using a variety of support materials, the most generally used backup being printed materials of all kinds.

Simplification of presentation extends to the number of different voices used for any given session. If "recognizability" of the speaker is important for the understanding of the message (in a panel of experts, for example), then presentation of too many voices tends to confuse the audience. Maximum number of individual voices seems to be four, unless each speaker reiterates "who he is" with each transmission.

3) Repetition

Repetition seems to play an important role in presentation structure. Repetition helps to overcome the absence of "referability" that print messages have. (Printed support materials can complement a telephone-based system.)

Conditions for listening (i.e. interruptions at a site classroom by someone arriving late to class or noise from an open window) vary at widely scattered locations, so building in repetition helps to overcome any break in the transmission of a message due to some of these unforeseen sources.

4) Feedback

To take full advantage of the two-way interactive capability of a telephone system, opportunities for feedback situations such as discussion are important to consider in designing programming.

Because there may not be a chance "on the air" for feedback from every student who wants to participate, methods to provide for this feedback in other ways may be planned such as evaluation forms, phone calls, and personal visits by the instructor to individual locations.

5) Structure

Some "structuring" (both of the group interaction and the content material) appears to be basic to "organizing for learning" in a telephone-based system.

The large, complex "group" (composed in reality of many scattered locations) needs to feel a sense of continuity. This continuity develops from the instructor/moderator providing the central structure around which group interaction takes place. Many times the facilitation of this group interaction is a function of prior-to-class structuring by the instructor—structuring known as "pump priming" techniques.

Content material is also structured through use of advance, concurrent and post organizers. A printed outline forms a useful function in organizing, providing structure and referability to the audio message.

6) Participation

Participation in a two-way system is a definite goal. It provides variety, increased interest on the part of students, feedback for both teacher and students, and in many cases, an increase in learning, especially if attitude change is desired.

Although students themselves may want to participate, some encouragement probably will be necessary initially on the part of the instructor before the flow of interaction takes place. Many of the techniques used in adult education can be adapted to the telephone method of teaching. These techniques then provide the springboard for stimulating discussion over the system.

7) Personalization

For teachers and students using a telephone system, "getting to know" one another calls for planning or building in personalization techniques. These techniques can be very simple or more sophisticated depending upon the time frame of the course and the number of students involved.

Basic techniques for personalization are the biographies and pictures of guest speaker-instructor sent to students to enable them to identify with the faculty, and the compilation of a class roster which enables instructors to know students better and to relate more class activities to their needs. Frequent use of names and locations helps "identify" students and personalize the experience for everyone.

Although these techniques can be built into the program design, there is one other factor which seems to be significant in using the telephone-based system: teacher attitude. An enthusiastic approach to using the system is "catching"; students respond to the excitement generated by the teacher's attitude and interest in using this type of medium to its fullest capacity.

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TELECONFERENCING AS AN EDUCATIONAL MEDIUM: A TEN YEAR PERSPECTIVE FROM THE UNIVERSITY OF WISCONSIN-EXTENSION

Dr. Lorne A. Parker
Director
Instructional Communications Systems
University of Wisconsin-Extension

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"Mr. Watson come here, I want you."

Watson heard Mr. Bell's words over the wire and came running. That was the first message sent over the new device, the telephone, which, interestingly enough, began doing a useful communications job right from the start. Since that first successful call on March 10, 1876, perhaps no other single invention has had such a dramatic and positive influence on the lifestyle of Americans. And it continues to have impact 100 years after its inception as people are still finding new and exciting uses for the telephone.

Among those new uses is the concept of the telephone as an educational tool. Although the telephone has grown to be a mainstay of our personal and professional communication, it continues to be overlooked as an effective educational medium. During the past 20 years, its use for teaching has been limited in favor of more glamorous media, and the telephone has remained a virtually untapped natural resource for education.

Current demands on institutions of higher learning call for an immediate and well planned alteration in the traditional methods and ideas for extending the facilities of these schools to remote areas. These demands have forced administrators and educators to turn to the telephone, which is proving to be an excellent educational tool. Convincing people that the telephone can be the basis of a viable learning system has not always been an easy job, and perhaps those who are skeptical should take a lesson on the dangers of underestimating the telephone from the Western Union committee which was commissioned to evaluate the potential of Bell's invention . . .

"Alexander Graham Bell sees for the telephone a vast future as a means of personal communication by voice. He actually believes that one day they will be installed in every residence and place of business. This fellow Bell's profession is that of a voice teacher and particularly a teacher of the deaf. He appears to have had no previous experience with any other form of communication, electronic or otherwise; yet he claims to have discovered a concept which has been overlooked by hundreds of experts who have spent years in this particular field.

"Bell's proposal to place his instrument in every home and business is, of course, fantastic in view of the capital costs involved in installing endless numbers of wires.

"Bell expects that the individual home owners will use his instruments without the aid of trained operators. This is ridiculous, of course, Obviously the public cannot be trusted to handle technical communications equipment. Furthermore, when making a call, the subscriber must give the number verbally to the operator, who will have to deal with persons who may be illiterate, speak with lisps or stammer, have foreign accents, or who may be sleepy or intoxicated when making a call.

"Bell expects that the subscribers to his service will actually pay for each call made, and that they will agree to pay a monthly minimum if no calls are made. We feel it is unlikely that any substantial number of people will ever buy such a concept in view of the fact that there are telegraph offices now giving efficient round-the-clock service in every neighborhood, in even the smallest towns.

"In conclusion, the committee feels that it must advise against any investment by Western Union in Bell's scheme. We do not doubt that it might find a few users in special circumstances such as between the bridge of a ship and the engine rooms, but any development of the kind and scale which Bell so fondly imagines, is utterly out of the question."[1]

Of course Bell's telephone device went on to become the backbone of the world's largest company while Western Union is now struggling for a product. Fortunately, Extension administrators at the University of Wisconsin did not show the same lack of confidence in the potential of the telephone as did Western Union. The changing demands of education stimulated the University of Wisconsin-Extension to develop new educational communications systems to provide students throughout the state easy access to the campus.

Among the problems concerned with off-campus teaching is the number of hours spent by instructors traveling from the resident campus to the off-campus class. Often an instructor would spend more hours on the highway than in the classroom. To help alleviate this problem, the UW Extension developed two new educational communications systems. The Educational Telephone Network (ETN) was initiated in 1965 as a means to expand educational opportunities to Wisconsin residents at a minimal cost. Another statewide communications system called SEEN was developed five years later. SEEN, the Statewide Extension Education Network, is a two way network that offers visual as well as aural communication. These two systems, ETN and SEEN, have been combined within one administrative unit, Instructional Communications Systems.

Educational Telephone Network (ETN)

ETN, as the Network is known in Wisconsin, is a 4-wire dedicated telephone network that takes the form of a huge party line. The two-way interactive medium reaches into ETN learning centers in courthouses, extension offices, University of Wisconsin campuses, libraries and hospitals. The network interconnects 200 locations allowing University of Wisconsin

Extension faculty to reach 120 different Wisconsin communities simultaneously. Students at any one of the ETN locations listen to a lecture or panel discussion, ask questions, and exchange observations with fellow students at any of the other locations connected to the system.

Statewide Extension Education Network (SEEN)

SEEN combines a 4-wire telephone system similar to the ETN system with an electrowriter which permits the transmission, reception and projection of diagrams, formulae, outlines, in short, any line drawing which customarily could be made and displayed on a classroom chalkboard. The SEEN system allows the teacher at any one of 23 locations to instruct the class, which is located in widely scattered areas about the state. Each remote location instantaneously receives both written and voice communication from the instructor. In addition, each student in the off-campus class is able to talk with the teacher and classmates.

These systems, which enable residents around Wisconsin to benefit from the educational opportunities found at their state university, will be examined at length later in this paper. First however, it seems beneficial to consider how these networks grew from the original, innovative concept of the use of the telephone for outreach education to the reality of ETN and SEEN.

A Brief History

The University of Wisconsin has a long tradition of providing educational opportunities to students in their home communities. In 1907, Charles Van Hise, then president of the university, challenged educators to extend "the boundaries of the campus to the boundaries of the state." This, the Wisconsin Idea, has been applied successfully to education. It has lived and grown through the years and is the basic philosophy behind the implementation of the two communications systems mentioned above.

Education via telephone, not as a network, began in Wisconsin as far back as 1962, when the University at Madison presented a science lecture to students at La Crosse. Much earlier examples of such point-to-point use of the amplified telephone messages in education could be found in other parts of the country. Actually, the idea of using the telephone for teaching was conceived in the early 1950's. Before that, attention was focused on teaching students how to use the telephone. ETN was established in 1965, by the Department of Postgraduate Medicine, after an unsuccessful try at using a two-way radio for statewide educational conferences for doctors. One of the doctor's big problems is fulfilling his moral responsibility to his patients and keeping up with current events in medicine at the same time. There are so many demands on a doctor's time that taking a day off for education often becomes an impossibility. ETN helped provide the highest caliber of medical instruction at a low cost, while incorporating topics directly applicable to clinical practice and presenting programs on a continuing basis in doctors' home communities.

Started With Conference Calls

From November, 1965, through February 15, 1966, general medical conferences were conducted over a traditional telephone conference circuit. An operator called in each station fifteen minutes prior to the program time and established the network. At the conclusion of the hour, the network was disconnected.

Original Programs

The first program consisted of a thirty-minute lecture that was tape recorded in advance. The lecturer provided an outline of his/her lecture along with the visual materials to be used. These materials were duplicated on 35 mm. slides. Sets of slides were loaded into cartridges for projection at stations in the network. The slides and copies of program materials were mailed to each conference location a week in advance of the program.

At the time of the program, the recorded lecture was transmitted over the network. The format was modeled after the system developed by Dr. Frank Woolsey and his associates at Albany Medical College for use on their two-way radio conferences. The lecture, at the appropriate time, called for the slides, which were shown at each conference station. After the lecture each station was called in a predetermined order so that listening physicians, through a moderator, could question the lecturer or comment on his presentation. All questions and answers were heard over the entire network.

The "Gee Whiz It Works" Stage

Despite the lengthy setup time, the cost, and the various interruptions, the telephone system was an unexpected success. With this shakey but determined beginning, Postgraduate Medicine took the first step toward a brand new form of continuing education. With support from far-sighted Extension administration and the dedication of medical educators, the lines of the huge Educational Telephone Network were leased from February to May of 1966.

In February, medical conferences were conducted over the network of private telephone lines leased on a full time basis for teaching purposes. This eliminated the need for operators, switchboards and other equipment, and greatly reduced the potential for equipment malfunctions or personnel error. Initially, there were 18 stations scattered throughout the state. The station closest to Madison was approximately 30 miles away; the farthest, 350. There were 190 physicians enrolled at a cost of approximately $2.00 per person per hour. At the same time, University Extension employed a fulltime specialist to develop the network for educational use with other Extension programs.

Reactions to the first few programs varied. Some people thought ETN would never last the year. Others were excited about its great potential, while still others waited on the fringes in mild curiosity. When medical educators made the first leased-line telephone network presentation, the number of stations had increased to 27, and nearly 3000 doctors were participating. Could it really work? Extension nurses thought it could. Only the second group to join, they offered an experimental series of 12 programs, beginning in February, 1966. Pharmacy joined the users in the spring of the same year. With the help of the department of Postgraduate Medicine, the School of Social Workers and Extension Veterinary Medicine also used ETN that spring. The lease expired the last day of April, but a substantial gain had been made in ETN use, and the doubters were few. During that first attempt at telephone teaching, 67 presentations had been made to 1,970 clients.

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In the fall of 1966, the network was leased for another nine months, and half a dozen more Extension units made their impact felt on ETN. In 1967, ETN not only expanded in the number of locations, but in the diversification of its programs, which started with Chancellor Donald McNeil's University Extension faculty meeting via ETN. Extension people looked forward to the next year with renewed vigor and eager optimism, and they were not disappointed. Requests for the use of ETN were growing daily. It seemed that everybody wanted to make at least one presentation on the network. With programs ranging from English, physics and sociology to touristry and horticulture, one department after another clambered on the ETN bandwagon. By the 1968-69 season, 982 programs were presented to 80,000 participants at 121 stations around Wisconsin.

Program Format

Most of the ETN programs offered during the developmental stage were continuing education or noncredit. Then departments such as library science and education began presenting graduate level courses for credit on ETN.

The format of the ETN programs was mainly one of lectures or panel discussion, followed by question and answer sessions. Lectures were usually live, but some were prerecorded. Programs varied in length from 30 minutes to two hours. Visual material was sent to each listening station for many of the ETN programs. These materials, usually slides, were projected on a screen in conjunction with the lectures. Film strips, printed materials and transparencies were also used.

Faculty continued to experiment with the new statewide instructional system. Glenn Barquest, a 4-H Woodworking specialist, succeeded in an ambitious attempt to teach exterior wood finishing to 4-H key leaders on the ETN system. During the session, 4-H leaders watched 35 mm. slides, reviewed step-by-step procedures, and examined sandpaper and wood samples referred to by Barquest. The leaders created wood stains by mixing pigments, oils and solvents, and applied them to the wood samples which had been sent out to each student.

Before the presentation, Barquest had recruited a group leader at each location who was responsible for the meeting room and its facilities, for obtaining materials necessary for the demonstration, and for relaying the questions and comments of his group during discussion.

With the success of teaching woodworking via telephone, the instructor was able to spend more time teaching and less for travel, thus enabling him to rapidly increase 4-H woodworking leader training throughout the state.

Crossing State Boundaries

Although ETN was located only in the state of Wisconsin, faculty found it could be linked with any other city in the country. A person in New York, Chicago or San Francisco could be connected to the entire ETN system. Such a hook up was made between a National Social Workers convention in San Francisco and ten ETN stations in Wisconsin. The audience in Wisconsin could hear and respond to lecturers in San Francisco as well as to one another. The programs were an exciting success.

An Economic Plan

To illustrate the economics of the network, the statistics from a statewide conference held in 1967 by Chancellor Donald McNeil are impressive. Over 418 Extension workers participated at 42 ETN sites around the state. No one drove farther than 88 miles round trip for the conference, and the average round trip was about 55 miles. Many had no driving to do as installations were in or near their offices. The total distance driven by all participants was about 1,700 miles, which, at 7¢ each, would have cost around $120. Had the meeting been held in Madison, these 400 people would have driven about 20,600 miles at a cost of close to $1,500.[2]

Establishment of Operational Procedures for ETN

Statewide Extension faculty agreed that the telephone system was an excellent and economical delivery system, but policy and operational procedures had to be developed to insure quality, and implementation factors of the program had to be taken into account.

In order to provide an overall operational process for implementation and planning of the ETN programs throughout the state, a faculty advisory committee was appointed by J. Mitchell Mackey, Community Affairs Chairman, April 9, 1969, and headed by Prof. Leonard R. Anderson, Chairman, Monroe County Extension Office. The committee was representative of each district within the state, and included continuing education specialists, county agents, agricultural specialists and communication specialists. The committee's major objective was to provide an operational framework for ETN programs. Statewide programming faculty agreed that using the Educational Telephone Network effectively and providing quality education programs would necessitate proper timing and effective program coordination by programming departments and the Extension county faculty.

One of the first tasks put to the Anderson I Committee was the standardization of terms. The following list of terms was adopted to clarify further discussion of the ETN and SEEN systems:

1. Instructional Communications Systems (ICS) is a department in the Educational Communications Division, one of the six major divisions of University of Wisconsin-Extension. ICS is responsible for the entire ETN-SEEN operation, including design of programs, coordination between the programming departments and local program administrators, technical operations, engineering of the Educational Telephone Network and the Statewide Extension Education Network (SEEN) systems, program evaluation and general administrative functions.

2. Program department means the department or the person responsible for supplying the content and general organization of the ETN-SEEN program.

3. District Director is the person responsible for the supervision of the community programs facility located in the county. It is the responsibility of the District Director to administer the ETN-SEEN locations within his/her district. It is also the responsibility of the District Director to appoint a Local Program Administrator for each ETN-SEEN

listening facility located within his administrative district.

4. Local Program Administrator (LPA) is the District Director's designee to assume the responsibility of coordinating, promoting and administrating all programs to be transmitted by the ETN-SEEN systems at the particular designated listening locations. Each LPA is appointed yearly and notified by the District Director in writing. A list of LPA's is provided by each District Director to ICS by April of each year.

5. The studio moderator is the person responsible for conducting the ETN-SEEN programs, either from the campus Old Radio Hall Studio of the University of Wisconsin or from a predesignated location.

6. Local program convener is the person selected by the programming department and by the Local Program Administrator to assist with programs at the local level. The convener can have many roles such as identifying clientele for programs, assisting students in developing a familiarity with appropriate communications systems used and, in general, helping people obtain a positive educational experience.

7. The instructor might also double as the studio moderator but is mainly responsible for the delivery of the program content.

Another duty of the committee was to make recommendations for programming procedures for the telephone network. Their suggestions included the following procedures:

1. A centralized registration should be established to allow Community Programs faculty to know prior to an ETN program how many students were going to be enrolled.

2. An Extension office chairman should be appointed as a Local Program Administrator of the ETN location.

3. The Local Program Administrator would then assist in determining program feasibility as it relates to the desires and needs of local clientele.

4. The Local Program Administrator would determine priorities for the use of county space needed to conduct ETN programs.

5. The publicity and promotional materials for an ETN program would be prepared by the programming department. Promotional materials would be supplied to the Local Program Administrator or his designate for distribution in the community.

Other recommendations included that a 60 day lead time be provided for all programs which required registration, and that all the programs planned on ETN be submitted to each Local Program Administrator prior to the semester offerings.

The series of recommendations was printed in an ETN program handbook which was distributed to all faculty members. In conjunction with the handbook, a series of faculty training programs were conducted in each district with various programming departments.

Acting on the Anderson Committee's recommendations was probably the most significant step toward the total development of the Educational Telephone Network. The committee had the foresight and the ingenuity not only to make recommendations, but to make sure that they were implemented and reevaluated as problems occurred. This committee realized that future classrooms could take many forms. They knew that good teachers for adults can be used constructively to reach many people throughout the state and that mediated instruction can be constantly improved through research.

New Era

So the system worked. Now students were asking for a quality system and quality programs. Faculty members began placing greater demands on the system by coming up with creative uses for the network. The growth of ETN was quick, but it would take time to develop the system and techniques necessary to insure high quality education. Since the initial Anderson Committee had been so successful, an Anderson 2 Committee was appointed.

Dean's Advisory Committee

The Dean's Advisory Committee (better known as the Anderson 2 Committee) was appointed by Dean Luke F. Lamb, Educational Communications, UWEX, to explore and re-examine previous guidelines for the ETN-SEEN operations. The committee was to look into five defined areas: 1. program design, 2. publicity and promotion, 3. technical system, 4. learning centers, and 5. operational procedures. To facilitate the study of these topics, subcommittees were formed with committee members volunteering to serve in the areas of their special interest. One advantage of having broad faculty representation on a major programmatic advisory committee is that members can be responsible for discussing recommendations within their respective disciplines. Thus a diversified response is gained from potential users and facilitators of the communication systems.

One of the basic assumptions behind the programming on ETN and SEEN is that a team effort must be made by the department doing the program, the Community Programs Division and educational media specialists. Only through a cooperative effort of all units and faculty members will students throughout the state benefit from these systems.

Each of the recommendations offered by the committee was approved by the administration and provided a basis for the development of a handbook on procedures, program design, promotion, publicity, and operation of the Instructional Communications Systems.

Specific committee recommendations are incorporated in other portions of this paper which are being given by other members of the Instructional Communications Systems faculty. I certainly do not intend to repeat their remarks, but it should be pointed out that the Anderson 2 Committee served as a springboard for faculty, administration and students to explore and develop a new improved Educational Telephone Network and station and conferencing equipment. Immediate effects of the Anderson Committees could be summarized in the following way:

1. The committees made sound realistic programming recommendations.

2. They provided a mechanism to make faculty aware of the intricacies involved in programming on a teleconferencing system.

3. The committees reinforced the Extension instructional program teamwork concept, which joined subject matter specialists with Community Extension Faculty and communications specialists, to work together to provide quality, efficient educational programs for people throughout the state.

4. They developed pragmatic guidelines for the effective use of teleconferencing systems.

5. These committees served as an awareness stage for Extension administrators, providing an overall plan for the administration to appropriately budget for the improvement of the systems.

6. They provided a system for in-depth involvement of outside expertise, such as telephone company personnel and state communities, to assist in the overall improvement of programs through technical systems and program design.

7. The committees provided a basis for the development of new and improved technical communication systems.

The Anderson Advisory Committees established a strong foundation on which teleconferencing systems in Wisconsin could grow.

Wisconsin's Teleconferencing Systems Today

Within the positive atmosphere created by the Anderson Committees, Wisconsin's Educational Telephone Network has expanded in scope as well as size, and has been joined by a second communications system, the Statewide Extension Education Network. To establish the status of these two systems today, let us look at each network and its operations in turn.

ETN, as described earlier, is a 4-wire dedicated telephone network which reaches into a large number of learning centers throughout the state. Today ETN provides an instant and personalized educational channel for more than 120 Wisconsin communities with over 200 specific listening locations. Enrollments for one year have reached more than 25,000.

Station Equipment

All the listening stations on the network have identical equipment. ETN uses a new communications unit, the Edu-Com, which was developed by Darome, Inc., Harvard, Illinois, along with the University of Wisconsin and the Wisconsin Telephone Company. The Darome Edu-Com is a portable, self-contained unit consisting of a large speaker and four microphones. The unit plugs into a standard telephone connector and AC power outlet. No technical skill or knowledge is required to operate the equipment.

Instructors may broadcast programs from any ETN location in the state or from the ETN studios located in Old Radio Hall on the University of Wisconsin-Madison campus. Anyone at a participating ETN location can be heard by all other linked locations by simply pressing and holding the lever on the base on a microphone and speaking.

The Edu-Com units were designed to be used by groups of up to 200 people. When the group is that large and a student has a question, the unit automatically turns into a public address unit at the location where the question originates.

Programs on the Educational Telephone Network System in Wisconsin

From the 18 locations participating in the original postgraduate medicine program, ETN has grown to accommodate many more listening locations and diversified programs. Programs now range from the original medical sessions to include pharmacy, English, law, social work, home economics, library science, education, nursing, physics, agriculture and engineering. The list goes on and on. Programs are essentially noncredit continuing education for professional adults throughout Wisconsin, but some credit courses are also offered. In addition, 4-H programs, extension faculty conferences and departmental staff meetings are carried effectively by this system. All of these programs vary from one to three hours in length and feature a variety of formats.

The Cost of the Educational Telephone Network System

Educational programming over the ETN system has evolved into one of the most important activities of many University of Wisconsin-Extension programming departments. And, the cost is minimal: cost per instructional hour for noncredit programs transmitted via ETN averages about 25 cents per student contact hour. This amount reflects the rental of the telephone system and payment of station equipment and its operation. It does not include the instructional materials used in a course or an instructor's time. The cost is determined by the total operating budget for Instructional Communications Systems, the unit administratively responsible for the ETN system.

Teaching Effectiveness Via the Telephone

But economy is not the sole factor involved in evaluating ETN. In the past ten years several studies have analyzed the effects of amplified telephone systems on learning. The research on teaching via the telephone is rather extensive, and seems to support the view that, with proper design of program materials, the telephone is an effective, inexpensive educational communication channel.

Most investigations on telelecture have centered around comparison of face-to-face lecture to remote telelectures. Studies include all types of subject matter such as: graduate courses (Hartje, 1973); undergrad credit (Hoyt & Frye, 1972, and Zimmerman, 1970); teacher education extension courses (Blackwood & Trent, 1968, and Pellett, 1970); formal adult instruction at places of business with the instructor rotating his appearance among the locations, (Gold, 1973); and art education (Jesser & Clarke, 1966). As early as 1963, Beattie and Frick reported that high school American history had been taught by a college professor via a telelecture system.

All the studies indicated that telephone classes were as successful as face-to-face classes, or that the telephone was capable of being used for effective education. Following are brief summaries of some of the more revealing studies.

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EDUCATIONAL
TELEPHONE
NETWORK
1975-76
SUPERIOR
WASHBURN
ASH-
LAND
HURLEY
DOUGLAS
BAYFIELD
ASHLAND
IRON
VILAS
EAGLE RIVER
FOREST
FLORENCE
FLORENCE
BURNETTE
WASHBURN
HAYWARD
WEBSTER
SPOONER
SAWYER
WINTER
PRICE
PHILLIPS
MINOCQUA
ONEIDA
RHINELANDER
CRANDON
NIAGARA
MARINETTE
POLK
RICE
LAKE
BARRON
RUSK
LADYSMITH
BALSAM
LAKE
BARRON
LINCOLN
TAYLOR
LANGLADE
OCONTO
MERRILL
ANTIGO
MARINETTE
ST. CROIX
DUNN
CHIPPEWA
NEW
RICHMOND
CHIPPEWA
FALLS
MEDFORD
MARATHON
MENOMINEE
KESHENA
BALDWIN
MENOMONIE
CLARK
WAUSAU
OCONTO
DOOR
RIVER FALLS
EAU CLAIRE
SHAWANO
STURGEON
BAY
ELLSWORTH
PIERCE
DURAND
EAU CLAIRE
NEILLSVILLE
MARSHFIELD
PORTAGE
WAUPACA
SHAWANO
BROWN
KEWAUNEE
KEWAUNEE
PEPIN
BUFFALO
TREMPEALEAU
JACKSON
ALMA
WHITE-
HALL
B. RIVER FALLS
WISCONSIN
RAPIDS
STEVENS
POINT
WAUPACA
OUTAGAMIE
APPLETON
GREEN
BAY
MANITOWOC
WOOD
JUNEAU
ADAMS
WAUSHARA
WAUTOMA
MENASHA
WINNEBAGO
CALUMET
MANITOWOC
CHILTON
LA CROSSE
MONROE
LA
CROSSE
SPARTA
FRIEND-
SHIP
MARQUETTE
GREEN
LAKE
OSHKOSH
FOND DU LAC
PLYMOUTH
MAUSTON
MONTELLO
GREEN LAKE
FOND DU LAC
SHEBOYGAN
SHEBOYGAN
VIROQUA
VERNON
SAUK
REEDSBURG
PORTAGE
DODGE
JUNEAU
WEST
BEND
OZAUKEE
PORT
WASHINGTON
BARABOO
COLUMBIA
RICHLAND
CENTER
PLAIN
CRAWFORD
PRAIRIE
DU
CHIEN
GRANT
IOWA
DANE
DODGEVILLE
MADISON
JEFFERSON
WAUKESHA
WAUKESHA
MILWAUKEE
SO. MILW.
WAUWATOSA
LANCASTER
PLATTEVILLE
LAFAYETTE
DARLINGTON
GREEN
MONROE
ROCK
JANESVILLE
BELOIT
WHITE-
WATER
ELKHORN
WALWORTH
RACINE
KENOSHA
RACINE
SURTEVANT
KENOSHA
• ETN COUNTY LOCATIONS
○ ETN UW CAMPUS AND
CENTER LOCATIONS
◆ ETN LIBRARY LOCATIONS
(ETN HOSPITAL
LOCATIONS OMITTED)
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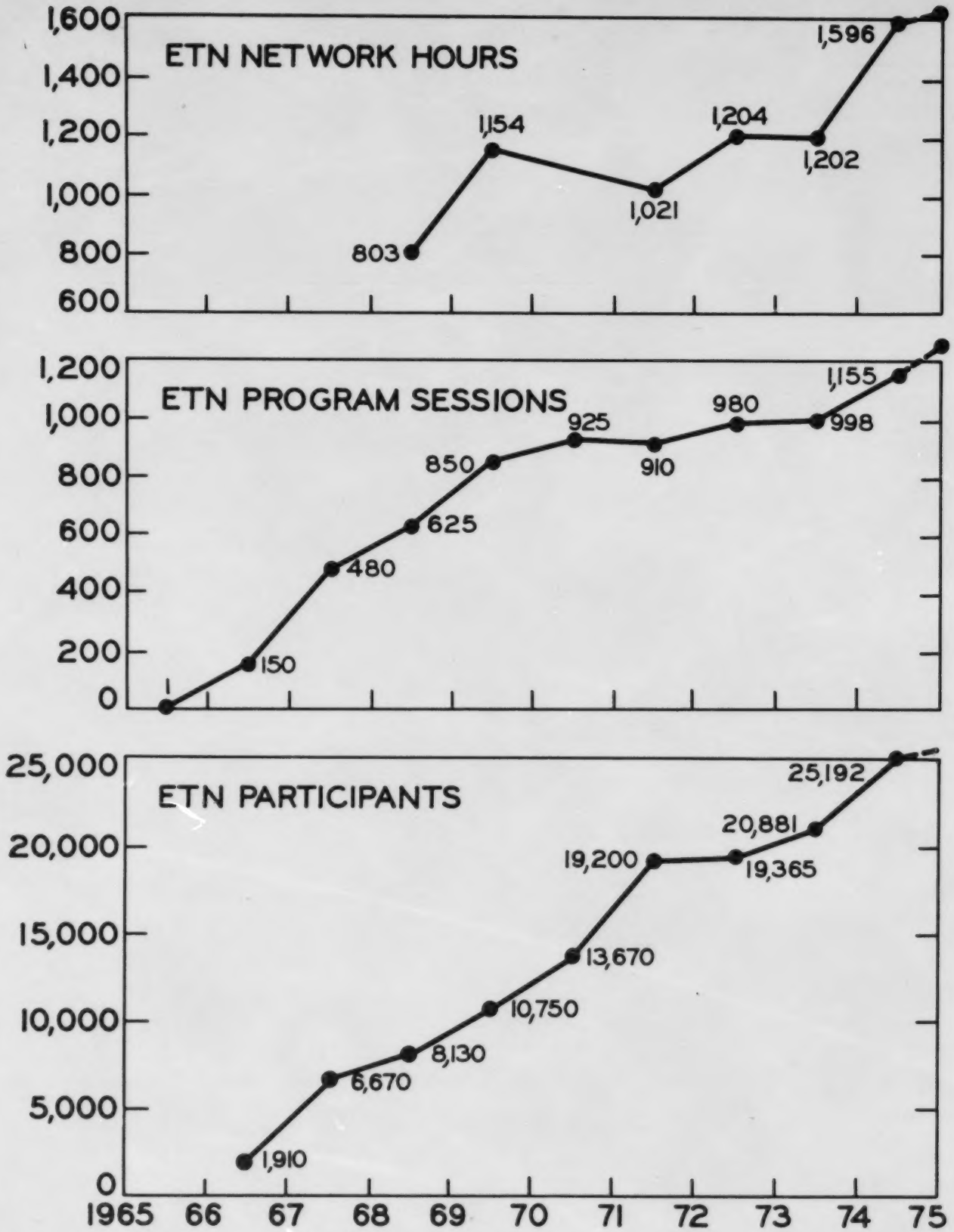
ETN NETWORK HOURS
1,600
1,400
1,200
1,000
800
600
803
1,154
1,021
1,204
1,202
1,596
ETN PROGRAM SESSIONS
1,200
1,000
800
600
400
200
0
1
150
480
625
850
925
910
980
998
1,155
ETN PARTICIPANTS
25,000
20,000
15,000
10,000
5,000
0
1,910
6,670
8,130
10,750
13,670
19,200
19,365
20,881
25,192
1965
66
67
68
69
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74
75

Feedback--Discussion. Etzioni (1972) indicated that a real strength of the telephone for education is that it provides a mechanism for real-time dialogue between geographically dispersed groups and continuous feedback between students and instructor.

Sharing Resources. At a time when most educators are looking for quality educational resources at the lowest possible cost, Parraton (1969) indicates that a telephone lecture network can provide a vehicle for universities to share information and instructors.

Effective Use of Telelectures. Puzzuoli (1970) suggests that telelecture teaching is more effective when the professor limits continuous lecturing to 20-25 minutes, provides printed material, uses audiovisual techniques as a supplement, makes a number of personal visits to the remote locations and bases the class on problem-solving techniques.

Limitations of Non-Visual Two-Way Transmission

As research and 10 years of Wisconsin's ETN programming experiences have shown, the two-way channel can be a highly effective means of reaching statewide clientele. The system has many other strengths: it is a truly continuing education medium open for all; it is a time and money saver for those who instruct courses and for those who attend; it can reach entirely new audiences in the state; it can reach isolated professionals; and it can be a vehicle for universities and other institutions to share resources. However, we also need to shift gears briefly and look at the other side, the inherent limitations of non-visual, two-way audio transmission. Subject matter specialists who use the ETN system need not only to understand the system and its capabilities, but also to respect its limitations.

STUDENTS HEAR FELLOW CLASS MEMBERS AND INSTRUCTORS through the speaker at their locations and use the microphones to ask questions or make comments heard by all their classmates. No technical skill is needed to operate the classroom equipment. Each ETN classroom has a DAROME Edu-Com unit consisting of a speaker and four microphones that link students and their instructor. Additional microphones and speakers can be added by plugging them into the base unit.

It's Hard Making A Listening Group a "Group." One limitation of a system like ETN is that, when 165 people are scattered all around the state at some 50 different ETN locations, it's hard to make the listening group a "group" and not just a collection of strangers. It is hard, but with extra effort on the part of the instructor a current of group feeling and rapport can be created.

--it can be as simple as an instructor always calling his students by name when responding to their questions or comments. With a roster in front of him, this can be easily done.

--it can be an instructor travelling out into the state to various ETN locations to originate some of his programs and then visiting students in their work situations for an hour or two following the lecture.

--or it can be as simple as an ETN-O-Gram, a half sheet of paper on which students are invited to share information with or ask questions of an instructor if the ETN program time happens to run out. It's simply a device to let students all around the state know that no matter how many miles separate them, two-way communication channels are always open.

Discussion Doesn't Just Happen. A second limitation of two-way audio transmission is that adults like to get actively involved in the learning process. That desire for two-way communication, between students and instructors and among students, is the basic justification of ETN's existence. However, no matter how much adults want that opportunity and no matter how easy it is technically, instructors often have to work at getting discussion started.

The new learning environment of an ETN program and the ETN equipment are usually only first evening barriers with most students. There are other reasons why they may be reluctant; some may feel they're infringing on precious program time, other student's time, or that their question or comment may not be worded right. On the other hand, students may be more inclined to ask questions on a telephone system than in a normal classroom situation.

Discussion via ETN may take extra instructor effort to get it going and might need to be continu-

A STUDENT WILL HEAR all 200 locations interconnected on the ETN system, and, by simply pressing the push-to-activate bar on the microphone, the student's voice is transmitted through a "public address" system so that all students within the same room will hear the conversation.

ally reinforced during the program. That effort can include such things as an instructor asking students to fill out an identification card so that he can learn something more about a student than his name. He can use this information to draw upon students' personal experiences and help lead them into discussion.

SEEN

The limitation of a purely audio communication system was one reason for the initiation of SEEN, the Statewide Extension Education Network. Because the Educational Telephone Network offered the possibility of communicating only oral information on a two-way basis, the Extension Engineering faculty saw serious drawbacks in trying to teach their courses via this system. Major portions of engineering lectures and discussions involve the use of mathematical equations or other graphic information. Even though the economies of ETN were beneficial, engineering faculty could give little serious consideration to teaching their courses over this system until technology came to the rescue.

In 1969, the electrowriter was added to ten ETN locations and was an immediate success. Students and their instructors liked the system and its potential. An exchange of electrowriter courses was soon developed between Wisconsin and the University of Illinois. The scheduling of Wisconsin and Illinois courses proved to be difficult due to the number of other programs carried over ETN and necessitated the installation of a separate electrowriter network, SEEN.

UWEX's Statewide Extension Education Network is an educational system that provides instructional programs via telephone, offering visual as well as two-way aural communications.

When SEEN was initiated by Extension Engineering in 1970, it distributed courses to locations which serve 80% of the Wisconsin population. In 1972, Instructional Communications Systems was charged with the administration, coordination and operation of the Statewide Extension Education Network, thus permitting the use of the network by any department within the UW system. Through the use of SEEN, the University programming departments are able to meet

SEEN IS A 4-WIRE TELEPHONE PARTY LINE allowing for instantaneous two-way communication. Students at all locations are able to view the material exactly as it is created by the instructor and may respond or ask questions at any time during the presentation by simply speaking into one of the microphones provided in the classroom.

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educational needs of many adults who previously could not be served with credit and continuing education programs in the state.

The Technical System

The audio portion of the SEEN network is a 4-wire telephone "partyline" similar to the ETN system that is used for instantaneous two-way interaction among students and instructor. The Darome Edu-Com, the station equipment used at each SEEN location, allows students to speak to each other easily via microphones.

In addition to the voice presentation and conversation, the Victor Comptometer Corporation Electrowriter permits the transmission, reception and projection of any line drawing which customarily could be made and displayed on a classroom chalkboard. Students at all the locations are able to view the material exactly as it is created by the instructor and may respond or ask questions anytime during the presentation.

Besides its instate network, SEEN is flexible enough to tie a telephone call from anywhere in the country into its system, thus providing instantaneous contact with experts in many disciplines.

Operation of the Electrowriter. The teacher or instructor writes on an electrowriter transmitter with an ordinary ballpoint pen. Pen position and movement creates tone signals which are carried over regular telephone lines to electrowriter receivers in SEEN classrooms around the state. These signals are translated by the receiver into an instantaneous and faithful reproduction of the instructor's writing. The image on the receiver is then projected on a screen which becomes the classroom chalkboard. Thus, through the use of telephone lines, a teacher can write and speak to class members located in a number of widely separated classrooms.

Wisconsin Electrowriter System. Electrowriters came into existence in the early sixties, and their instructional applications began later in that decade. Victor Comptometer Company of Chicago, Illinois, generally is credited as being responsible for the development and marketing of electrowriters. The system marketed by that company for instructional applications is properly referred to as VERB (Victor Electronic Remote Blackboard).

VERB systems may be bought in several configurations depending on the intended applications. A basic system consists of a transmitter and receiver, each of which have a writing area of 17.5 square inches, and two telephone lines. The University of Wisconsin-Extension Instructional Communications modified the VERB units to double the writing and viewing area, making, in essence, a two frame system. When one frame is being developed by the instructor, students can see the additional frame which was previously developed and discussed.

Within the last four years many University of Wisconsin-Extension departments have programmed on the SEEN network using VERB and the two-way audio system to carry educational activities in just about every field. Although the SEEN network was initially installed to provide educational opportunities for engineers around the state, the system is now used to teach graduate and undergraduate courses in engineering, mathematics, agriculture, education and business. The system is also used for occasional on-campus instruction to bring in outstanding faculty members from other campuses. All the programs transmitted on the SEEN network are recorded on a professional audio recording machine. Courses can be played back through the development of a Polaroid Compensator allowing for the rerunning of courses for students who might have class time conflicts, or have missed programs.

Programming on ETN and SEEN

The needs of Wisconsin's medical doctors produced ETN, and the needs of Wisconsin's engineers produced SEEN. Now the systems meet the needs of a variety of professionals and nonprofessionals, providing public service programs and continuing education in a wide range of subject areas.

In general, there are four programming areas the networks are used for: Continuing Education, Administrative Programs, Public Service and Credit Courses.

Continuing Education

Continuing Education, the largest area, and the basis of the entire teleconferencing network, is directed to professional adults: doctors, lawyers, pharmacists, nurses, engineers, ministers, librarians, etc. Most of these courses are practical in nature. Librarians, for example, might take a course to keep them up-to-date on new cataloguing techniques.

Aside from a voluntary interest in keeping professionally abreast of new developments, under Wisconsin's law, continuing education is mandated for certain professions. Lawyers will soon need 15 continuing education hours per year to retain licenses. Similarly, other professionals must receive a certain number of credits annually through university departments. These requirements put pressure on professionals to seek educational alternatives like the ETN and SEEN systems.

These systems are able to provide continuing education to an unexpected variety of clientele. ETN has finally invaded a most unlikely territory: piano teaching via the telephone. From the elegant, comfortable library in Cranbrook House in Michigan, pianist Gina Bachauer performed, discussed music and answered questions to a live audience of 200 piano teachers throughout the state of Wisconsin, none of whom had to drive more than a few miles to participate in the master class.

While Gina Bachauer performed Schumann's "Knderszen" and Moussorgskv's "Pictures at an Exhibition," participating piano teachers on the ETN system at some 70 locations followed along with music scores which they had brought along.

For only six dollars, a Wisconsin piano teacher could attend at one of the various locations in the state, and, by simply speaking into a microphone, could ask questions directly of the lecturer.

Preceding the Bachauer class, David Carr Glover lectured and answered questions for Wisconsin teachers from his own music studio in Portsmouth, Virginia. John Perry dealt with Beethoven's "Sonata Pathetique" from his bedroom in Austin, Texas. Talents of this caliber were interested in sharing their art with Wisconsin's piano teachers because no time was lost in travel, making the system attractively convenient.

Yet piano teachers all over the state were able to benefit and be inspired by some of the greatest artists in piano playing and teaching of our time.

Public Service Programs

Public Service activities include offering general interest programs such as Family Estate and Financial Planning, Smoking Modification, Legal Rights and Responsibilities in Marriage and Divorce, and the like.

Programming in this category, however, often serves very specific purposes. With the recent changes in election laws and procedures, a program was developed for state election officials centering on the duties of election workers and their authorities and assistance to new voters. The program was able to instruct election officials on updated basic procedures and the State's new election manual that was recently approved by the State Legislature.

Another case in point is an ETN course in which 3500 plumbers enrolled to learn the new solid waste codes passed by the State Legislature. When the State moved from locally regulated codes which varied from county to county to a State Regulated Uniform Code, the law also required compulsory training for plumbers and county officials in interpretation of legislation and in implementation of the new code. The 3500 who attended the ETN classes in their county courthouses once a week received copies of the code to study in advance. In class over the telephone network they were able to ask various legislators who wrote the law to clarify points and answer questions.

For the State Department of Natural Resources which had contracted with University Extension to give the course, the telephone network was an effective way to bring new information to its clientele. Training was completed in less than two months, while the Department of Natural Resources estimated that, otherwise, it would have taken fourteen.

Credit Programs

A small portion of the total offerings of the ETN programs, some 5%, is designed for undergraduate and graduate credit. Many of these are education courses. The proportion of credit offerings is small because credit is readily available through traditional means. Most of the credit courses given on the ETN system are not duplicated on campuses, but are offered at the request of a number of students throughout the state.

Because most students enrolled in credit courses via the teleconferencing systems have not been exposed to nonconventional educational techniques, a training process is incorporated into the courses. To acclimate students to the system, the professor lectures from various ETN/SEEN centers, allowing each class around the state to participate in some live lectures. Lectures are transmitted by means of the regular ETN station equipment using a special remote microphone that plugs into each ETN Edu-Com station unit. The lecture is transmitted via ETN/SEEN to students at participating campuses. Slides, videotapes and 16 mm. films used in conjunction with lectures are mailed to each location in advance.

Although the telephone network offering of credit classes is not new in Wisconsin, it was an innovation to offer the same course simultaneously to additional campuses outside the State. Professor Burton Kreitlow taught a course in Adult Basic Education: Principles and Practices, to the Educational Telephone Network students in conjunction with a graduate class in Tuskegee, Alabama. Kreitlow indicated that he tried a few educational teaching techniques that worked well on the telephone network. The list includes:

1. Using resource persons on the network once or twice each semester.

2. Student led discussions.

3. Student oral responses to questions assigned in advance.

Through Dr. Kreitlow's experiences in teaching two courses on the telephone network, one interconnecting an additional class in Tuskegee, Alabama, he feels that the telephone network has a place in continuing education of adult educators and others where the number of those seeking credit classes is too few to be efficient on a one teacher per site ratio. To teach on a teleconferencing system requires many adjustments from the usual campus class, but it can be done. All educators need to give top priority to trying and perfecting new and efficient ways of reaching students, and teleconferencing should be at the forefront of those methods considered.

Administrative Uses of ETN

The ETN system has been used in many different ways. Each Monday morning at 9 o'clock, for example, Extension faculty and staff participate in a statewide meeting conducted by the Community Programs Department. Subjects discussed at these meetings range from current topics to a report from the President on the Board of Regents meeting.

Every morning at 8:30, messages from the University Extension Office in Madison are relayed to faculty around the state. Immediately following this exchange, the traffic is reversed, allowing agents to forward messages to the Madison office. Right after this message service each morning, the system is reserved for fifteen minutes so county extension agents can confer with each other. Sometimes they make prior arrangements for their discussions, but more often than not, you can hear a faculty member such as Herman Smith say, "This is Smith in Oneida County. Is Merrill on the line?" The chances are pretty good that Merrill is on the line, and Smith gets his message through.

Among its other uses, the ETN system links regional faculties for informational exchanges. It also links 4-H Club activities, and it provides county Extension faculty an opportunity to exchange weekly information with agricultural specialists. A program starting at 8 a.m. every Monday morning with agricultural specialists discussing current agricultural problems and solutions has proven to be a very popular in-service training and informational program for county faculty.

ETN has also been used to disseminate emergency information to agricultural agents. Recently, an outbreak of corn yellow leaf blight brought Extension plant pathologist Gayle Worf to the telephone network during a Monday morning staff conference with informa-

tion for agricultural agents on the status of the disease and recommendations for its control.

As is readily apparent, the surface barely has been scratched in the development of teleconferencing as an educational media. With the proper planning and a little imagination, ETN and SEEN can meet a wide variety of educational and informational needs.

SEEN Programs

Unlike the Educational Telephone Network, SEEN offers more credit courses but still gives noncredit programs where professional engineers can obtain continuing education. In one instance, Clyde Crabb, Green Bay's Assistant Director of Public Works, used SEEN to borrow management expertise from specialists around the state. About a year ago, for ten weeks, he and Richard Hall, Traffic and Civil Engineer in Green Bay, used the system to consult regularly with specialists from the University of Wisconsin-Extension Department of Engineering. Crabb and Hall stayed close to their jobs and homes, and so did the specialists, 125 miles away. Despite the time and distance barrier between them, the consultation was easily accomplished over the University of Wisconsin-Extension's Statewide Extension Education Network.

The Subject: Public Works Management. SEEN, as was explained earlier, offers both audio and visual communication. Crabb, Hall and all other students around the state could view the material at their sites exactly as it was created by William R. Baker, class instructor, or one of his guest lecturers in Madison. Students could ask questions at anytime to any other student or instructor.

More than 70 people from all levels of the Public Works Operation and Planning Management participated in this SEEN course, which was given at Janesville, Wausau, Menasha and many other communities. All of these students were getting ahead in professional development, staying on their jobs and blending practical experience with study.

The SEEN system offers Wisconsin students a wide variety of undergraduate, graduate and continuing education courses each semester. Some of the SEEN programs are part of various continuing education Engineering studies offered by the Professional Development Degree Program in Engineering.

This unique, postbaccalaureate professional degree is administered jointly by the Faculty Committee of the College of Engineering, UW Madison, and the Department of Engineering, UW-Extension. Other noncredit offerings on SEEN include accounting, business management, art and education courses.

Graduate Credit--Business Education Course. The University of Wisconsin-Oshkosh Campus presented a basic foundations course for the MBA degree for a 2 1/2 hour period once a week. The Management Foundation course met for 16 weeks with 48 students and involved 10 locations in addition to the Oshkosh originating classroom. Management Foundations is a three credit course in a graduate curriculum which is completed by those who have no prior academic background in the Management area.

Economic Feasibility. With one instructor, 48 graduate students all over the state of Wisconsin were able to enroll in a Management Foundations course. While it is true that the instructor could handle this number on campus in one lecture at less cost, the fact is that only 16 students enrolled for the course at the Oshkosh campus, the principal sending station on the SEEN network. An additional 2/3 of the enrollment consisted of students who would have had to travel up to 100 miles to reach the Oshkosh campus.

The average cost for graduate instruction at the University of Wisconsin-Oshkosh School of Business Administration is approximately $55 per student credit. The average cost on the SEEN system is $9 per student contact hour or about $1.44 per student credit for a 16 week term.

Another economic factor, although not directly accountable to the school, is the student transportation cost. If students had to commute to Oshkosh from the 10 locations in this program, it probably would have made the cost prohibitive for most of the enrollees. Therefore, there was a larger gross enrollment than otherwise would have been the case. The school is ahead with a higher enrollment and the student is economically ahead by only having to travel a few miles to a SEEN receiving location.

Students' Academic Performance. Several students demographic characteristics were studied in relationship to the academic performance during a SEEN experiment course. Student ages ranged from 20 to over 40; several persons had little more than a high school diploma while one individual had credits above his Masters Degree. Fulltime business experience varied from none to over 15 years. Test score results on neither the mid-term nor the final showed any significant relationship with any of these variables. Similarly, when student test scores were analyzed according to class size and geographical location, no statistical difference was detected in their performance.

Finally, students were asked why they enrolled in the course, for example, to earn credit toward an MBA or for professional development. Once again, no evidence was found to support a hypothesis that SEEN is more beneficial for one particular kind of student. Therefore, SEEN seems to be applicable to a wide variety of students regardless of their backgrounds and goals.

Stimulated by the results of this graduate course in Management, there was a definite expansion of these types of program offerings which have been closely evaluated as they have developed.

Teleconferencing Evaluation Process

How a student-teacher relationship becomes a rich learning experience is a question that has intrigued researchers, curriculum designers and evaluators for decades. Put a telephone network and a few miles between student and teacher and the question is compounded: How should ETN programs be designed to provide the most fulfilling possible learning experience for all involved?

Discovering what's best for ETN program design is part of the process of evaluation. In order to evaluate ETN programs, two processes must be measured: communication and education. Like the chicken and the egg, the teaching methods and the medium of communication must be considered both as individual entities, and as interrelated factors contributing to the overall quality of the ETN educational process.

The Purpose of Evaluation

The purpose of evaluation is to determine the strengths and weaknesses of current programs so that improvements can be made in future program design. Changes in program design come about with an analysis of evaluation results by program coordinators, educational specialists and individual program lecturers. Through this exchange and analysis, the results of the evaluation can be built into the next learning experience.

This is the designated purpose of the evaluation for programs on the ETN and SEEN systems. The results are confidential and released only to the program coordinator. However, there are other peripheral benefits in conducting an evaluation. For one, it provides one additional channel of communication between the participants and the instructor. The evaluation is a tangible sign of interest in student opinion. This can be particularly meaningful for remote participants who have little contact with the home base of program origination.

Evaluation results are primarily a function of judging program effectiveness. In that process of judgement, the evaluation can stimulate consideration of overall goals and values in teaching. It is this stimulation that shapes the educational process and motivates improvement in educational quality.

The Development of the Evaluation Instrument

The Program Evaluation Checklist (PEC) is a systematic method of studying the profile of the adult participant and measuring the components of educational communication.

General Student and Program Information. This instrument collects certain demographic information such as age, sex and educational background. The individual program coordinator may specify any further information he/she may wish to obtain such as professional experience or occupation. These demographic variables are incorporated into the **General Information** portion of the evaluation. The data obtained constructs a student profile. It gives a present and future picture of target audiences for particular programs, and allows for a comparative analysis of various audience types' receptivity to teleconferencing programs.

Frequently, the General Information portion also asks if the audience has participated in ETN courses in the past and if they would be interested in future ETN programs. Experience with ETN programs will condition the participant's evaluation of the course, and his interest in future courses indicates modified reactions to the course.

Program Evaluation

There are essentially five steps in the original development of the evaluation checklist items. First, the critical expectations of ETN programs are identified. These are the programs objectives in the most general sense, i.e., the quality of student-teacher contact, scope, relevance and importance of subject matter, and the instructor's ability to tailor his/her teaching performance to an audio delivery system.

Second, course design must be broken down into various aspects which facilitate the ordering of data, and third, the objectives must be classified into these catagories. The following are the seven primary aspects and expectations with which the teleconferencing systems are concerned:

1. THE ENVIRONMENT--the arrangement of the physical facilities, seating, lighting, etc.
2. THE TECHNICAL COMPONENTS--the functioning of the mechanical components of the program
3. THE AUDIO-VISUAL MATERIALS--the use of auxiliary materials and equipment
4. THE PROGRAM AIDE'S BEHAVIOR--the performance of the persons responsible for the individual listening stations
5. THE LECTURER'S BEHAVIOR--the delivery of course material
6. THE PROGRAM ORGANIZATION--the involvement of the participants in the presentations and discussion of program content
7. THE PROGRAM INFLUENCE--the impact of the educational program upon the participants

Fourth, descriptor words for these categories are derived. The items as they appear on the evaluation are classified in six groups: 1) program facilities, 2) program lecturer, 3) organization, 4) program material, 5) program content, and 6) technical operations quality.

With these categories and descriptors formulated, course expectations are framed into positive, affirmative statements which describe the program from the student's point of view. These are the evaluation items. For example, "The material presented in this course can be applied to my present needs." This is followed by PM (program material). The preparation of the generalized descriptions of the principal program expectations (the items) is the fifth and final step of the evaluation.

At least five of these items are used for each of the seven program aspects. Usually there is one item at the end of each evaluation which asks for the participant's overall feelings toward the program, and frequently there is a space left for comments.

How the PEC Works - The Rating Scale

Each of these items are set against a rating scale. This rating scale is a systematic procedure for measurement which precludes the student's patience or writing ability, factors which often render an open-ended evaluation format invalid. Because of the geographic dispersion of the audience, evaluation by observation is impossible. The method of self-evaluation on a rating scale renders reliable data and allows for formulating conclusions about a program with a high degree of confidence. The data derived from its use is amenable to statistical analysis, and, as a research tool, it may be used repeatedly to test hypotheses in the field of educational communications.

The rating scale used is a ten-point ordinal scale which ranges from 0 to 9. With an ordinal rating scale, it is assumed that the intervals between numbers are psychologically equal from one number to the next, and the numbers increase in value in a

systematic progression.

The ordinal rating scale provides an immediate conversion of audience responses to numerical values, so that responses need not be converted for computerization. When computerized, ordinal scales render means, percentiles and standards of deviation with reasonable reliability. These three statistical outputs are adequate to our purposes.

The ordinal scale also allows for a satisfactory degree of reliable comparative analysis from item to item and from evaluation to evaluation.

The rating scale appears on the PEC instructions which explain that 0 indicates the item does not describe the course, and 9 means it very definitely does. For each item, the participant is instructed to fill in the number that represents his response. The responses are then run through the computer to obtain mean responses for each item. These means are further grouped into "subscores" for each of the program aspects. In this way, program strengths and weaknesses are easily pinpointed for an individual course, and the data provides a base for statistical comparison from course to course, from year to year.

This method of evaluation can provide relatively reliable feedback in a very short period of time, usually prior to course completion.

Evaluation Results

Evaluation results can be obtained in two forms, as computer printout or as evaluation highlights, which are prepared from the computer data. In the highlights, the results are written up for each subscore (or program aspect) and for overall evaluation results. For example:

Overall Evaluation

The participants were asked in item #28 to evaluate the course as a complete unit. The mean score was 7.01 with a standard deviation of 2.98.

And as it appeared on the computer printout:

ITEM	LOW	2	3	4	5	6	7	8
28	0.03	0.10	0.04	0.06	0.10	0.04	0.06	0.12

HIGH	OMIT	MEAN	S.D.
0.30	0.01	7.01	2.98

The printout breaks the data down into the percents of responses for each number of the rating scale. With this breakdown, it is easy to see what percent of the class rated a particular item very low or very high. This allows some expanded insight into the mean score. For instance, though the mean score is 7.01, which is not exorbitantly high, 30% of the participants gave the item the highest possible rating of 9. This sort of information can be obtained from the printout, but is also represented statistically in the Evaluation Highlights by the Standard of Deviation.

For the demographic information, both the highlights and the printout give the percent of participants falling into each category as it appeared on the evaluation.

For Example:

AGE: 23% are age 20-25, 41% are age 26-35, 23% are age 36-45, 13% are 46+

The increments for ages are fairly standard, but for other demographic variables, categories will be specified by the program coordinator. Obviously, a course in bookkeeping has a different clientele than a course in nursing, so for the variable "Occupation," selections would change.

Validity of the Evaluation Questions

One important characteristic of a good evaluation instrument is its validity. Does it measure what it is supposed to measure? Normally an instructor developing evaluation items decides whether or not his questions bear relationship to the presented material, particularly to the outcome of the program. These judgements by a single individual are subject to a large margin of error.

To be certain of validity and to improve the quality of the evaluation instrument, each item in the Program Evaluation Checklist bank was judged by a number of qualified individuals. All the items have been evaluated by students and faculty members. The evaluation items were rechecked for any ambiguity or irrelevant phrase by a professional editor who also estimated the reading level of the items.

Reliability

Reliability refers to the consistency of a test or, in this case, of the evaluation instrument. For example, if the evaluation is split into two halves, the students' scores on the first half should be similar to the scores on the second half. Reliability may vary from 0.00 to 1.00, but a good evaluation instrument should have a reliability coefficient of at least 0.80, preferably 0.90.

A MERMAC computer program is used to measure the reliability of each section of the evaluation instruments. The program not only determines the reliability of each cluster of items such as technical, lecturer, content etc., but also gives information for evaluation improvements such as quality of items, item difficulty and predictive power of an item.

The Spearman-Brown split halves technique is the basis for the computer program.

Using Evaluation Results

Since each of the subscores (program material, program lecturer, organization, physical facilities, technical operations and content) represent a judgement by different criteria, we are able to use the subscores to determine the strengths and weaknesses of the course.

The various subscores are interrelated, which must be considered when analyzing evaluation results: poor technical operations will condition the responses to other aspects; a very good lecturer can sway judgements of course material; etc.

Instrument Reliability

The evaluation data also provides an overall rating of all items taken together. The effectiveness

and reliability of the evaluation can be double checked by comparing the overall rating with the rating the participants gave to the item which asks for their overall feelings toward the program. These should be reasonable reflections of each other.

The Content Subscore is one that might be given some special consideration by the program coordinators. Most of the items on the PEC are standard within a certain range, but the content items are prepared primarily by the program coordinator. These items are related to course outcome, how well the material relates to what the students want and need to learn. At least five content items are created specifically for every course evaluated. The content items take the individual course objectives and frame them into affirmative outcome statements. For example, from a Real Estate Course: "I now have an understanding of listing contracts and contracts of sale"; from a course for English Language teachers, "I now am aware of a new approach to spelling."

In an analysis of the content items from the evaluation, a program coordinator or lecturer should be able to judge how effectively the course design and content fulfills the needs of the participants and how well the course met with its objectives.

General Comments

The comments returned by the participants with the evaluation are considered carefully with the data. Generally, the comments can be supplied in an aggregated, typewritten form. This is an important avenue of communication between instructor and participant, and should not be overlooked. Frequently, answers to particularly low evaluation scores can be found in the comments.

Summary

The purpose of evaluating teleconferencing programs is to help programming faculty determine the strengths and weaknesses of programs transmitted via the systems, so that improvements can be made in future programs.

In order to accomplish this task, a search was carried out for the appropriate method of studying the profile of the adult participant and measuring the components of educational communication. The search resulted in the selection and development of a rating-scale method of evaluation. This type of evaluation is most suitable because it represents a systematic procedure for measurement.

The data derived from the Program Evaluation Checklist is amenable to statistical analysis. It is also a research tool which may be repeatedly employed to test teaching techniques in the field of educational communications.

Administration of Wisconsin Teleconferencing Systems

Evaluation is only one of many tasks which must be performed to run these networks, and, as ETN and SEEN grew, they required an administrative unit to be responsible for their operations and educational program development. Instructional Communications Systems oversees these two systems and the Subsidiary Communications Authorization (SCA). In addition, ICS coordinates the use of Dial Access for Extension.

Instructional Services

In order to develop the most effective educational experience possible via the teleconferencing systems, ICS provides program coordinators to help plan programs on the systems. The services which ICS provides encompass the entire program:

1. program design--identifying a program audience and its objectives; formulating a budget for the program
2. program production--prerecordings, coordination of lectures from other sites and originating stations, tape duplication, tape packaging, etc.
3. program promotion
4. program registration
5. program evaluation
6. program packaging for independent and small group study
7. communication system development

Personnel for Instructional Communications Systems includes 11 fulltime staff members, student operators and part-time clerical assistants. Brief descriptions of the duties of ICS personnel are given below and supplemented by a chart which illustrates the administrative flow.

Director of Instructional Communications Systems

It is the responsibility of the Director of Instructional Communications to develop policies and programs offered on the ICS Systems. The Director works cooperatively with other members of the Educational Communications Division and Extension faculty and administration team. Since many phases of ICS programs have direct bearing on the instruction programs, there is a close working relationship between the Director and faculty, administration and students in the implementation of programs.

Assistant Director

The Assistant Director is responsible for internal administration of the department with emphasis on program production, program development and instructional design. This includes the management of the day-to-day operation which involves technicians, program coordination, traffic and clerical support for staff.

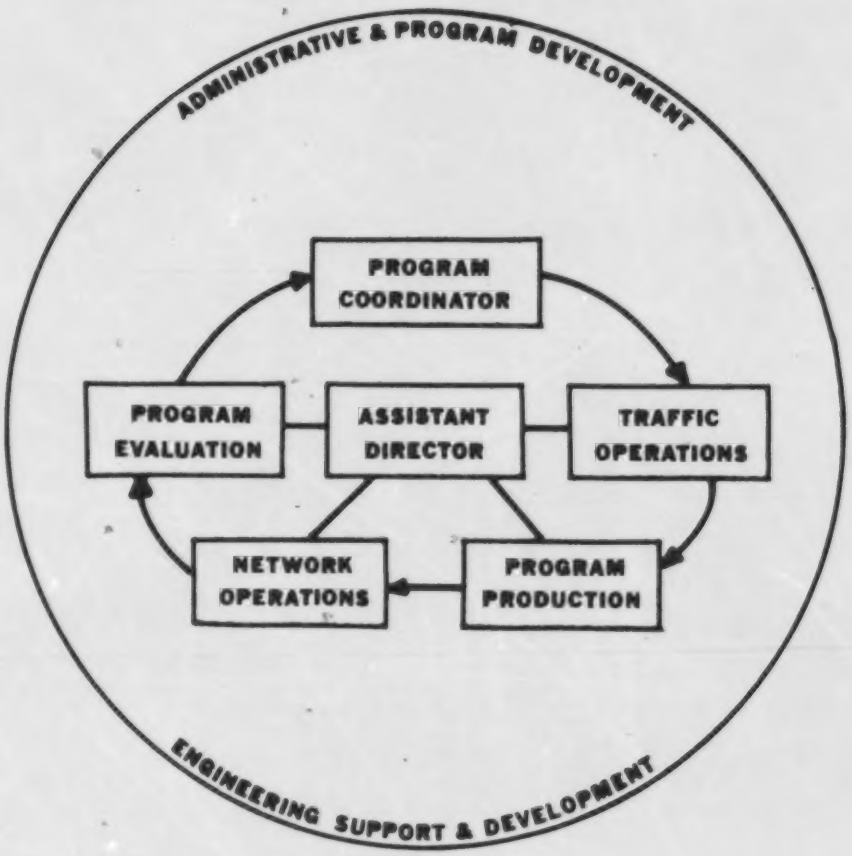
Technical Director

The major function of the Technical Director is to coordinate and supervise the development of all operations of ICS. If the communications systems are to be constantly improved, new technical developments must be explored and implemented to meet the needs of imaginative programming faculty.

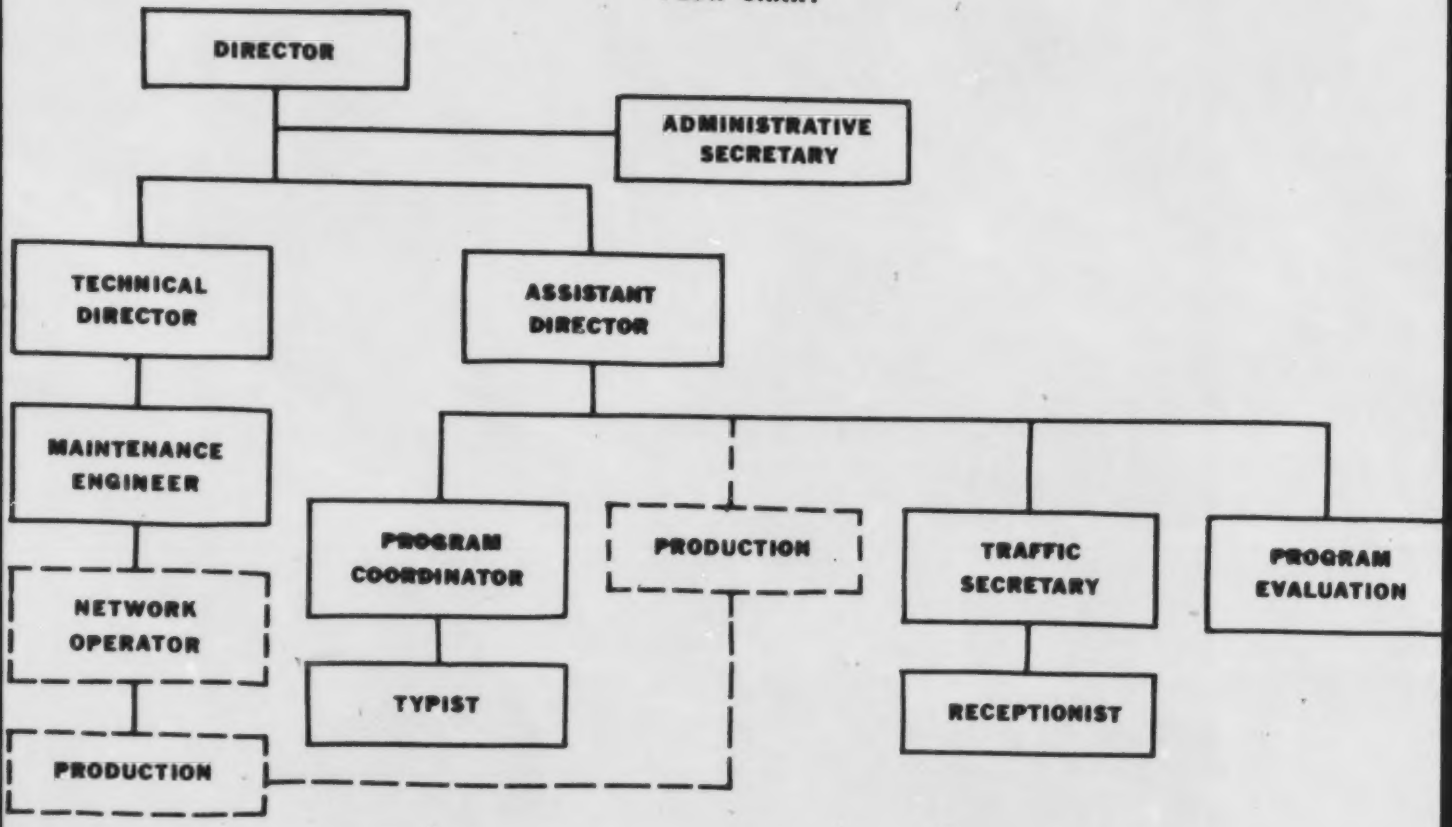
Operation Engineers

The successful completion of programs is directly related to the quality and operation of our network control room. The network control engineers are called upon to operate professional audio tape machines, cartridge machines, broadcast type consoles, complex audio distribution matrix, electrowriters and

INSTRUCTIONAL COMMUNICATIONS SYSTEMS (ICS)
PROGRAM OPERATION FLOW CHART



FLOW CHART


DIRECTOR
ADMINISTRATIVE SECRETARY
TECHNICAL DIRECTOR
ASSISTANT DIRECTOR
MAINTENANCE ENGINEER
PROGRAM COORDINATOR
PRODUCTION
TRAFFIC SECRETARY
PROGRAM EVALUATION
NETWORK OPERATOR
TYPIST
RECEPTIONIST
PRODUCTION

other sophisticated electronic equipment. These engineers are responsible not only for the program signal leaving the control room, but also for the reception and return signal. ICS operation engineers are required to have a Federal Communications Commission Radio and Telephone operator license as we have found it beneficial for the engineers to have a grounding in theory of electronics operation.

Program Coordinator

The Program Coordinator is responsible for the implementation of all the operational procedures that have been designated by faculty committees. This includes scheduling of programs, meeting with all Extension department programmers, providing assistance to the programming departments on design and promotion of materials, scheduling all listening locations for specific programs and serving as the liaison for the registration and program information office. Another critical function of this position is the training of Local Program Administrators and ETN aides that are hired on an annual basis to assist the program implementation at each of the ETN/SEEN locations.

ETN Station Equipment: Technical Data

While the Technical Director is specifically concerned with the development and operation of equipment, the entire ICS department is based on the assumption of a well working technical system. To be an effective instructional communications system, ETN must provide a means of instantaneous interaction among students and their instructor. The system of station equipment which serves ETN and insures this capability consists of the Darome Edu-Com II, installed at locations throughout the state and interconnected by a complex network of telephone lines. Approximately 5000 miles of wires and the facilities of 20 telephone companies are employed to provide this statewide system.

ETN must carry educational programs across the state without interfering with the ongoing teaching and learning process, and with proper educational design and technical operation, ETN can meet this demand. Every effort was made during the design and construction of the station equipment and transmission system to provide easy operation and reliable, trouble-free service.

ETN Station Equipment

The Edu-Com is a self-contained communications unit, with four microphones, which plugs into a standard telephone coupler. Via this unit, anyone at a participating ETN location can be heard at any of the other linked locations simply by pressing the lever on the Edu-Com microphone and speaking into it. Below is a summary of the Edu-Com's general, physical and operational features.

General:

A. Three built-in speakers provide good audience coverage.

B. The Edu-Com is equipped with four microphones, each of which has a push-to-activate bar. Everyone in the room can hear each speaker's questions and answers.

C. The Edu-Com II signal cord (20 feet) plugs into a sturdy 4 prong jack.

Physical:

A. The unit is self-contained: all four microphones and associated cords store inside the cabinet.

B. It is portable: each unit weighs only 20 pounds complete and has a convenient carrying handle.

C. The unit measures approximately 20 inches wide, 12 inches high and 9 inches deep.

D. All cord connections and microphone storage have been designed for easy set up and take down.

E. All associated electronics are solid state and contained within the cabinet.

F. The Edu-Com II cabinet has an attractive wood grain vinyl type finish and has clean lines for storage.

G. The microphones are rugged plastic and are self-standing.

Operational:

A. The unit is easy to operate. Once set up, the listener needs only to adjust the speaker volume control for comfortable listening level and depress the push-to-activate bar when he wishes to ask a question or respond on the network.

B. Speaker volume control is located on the side for easy access.

C. The Edu-Com II is AC powered with a pilot light to tell you when the unit is plugged in.

D. The four microphones are provided with cords 20 feet long to reach into the audience. Also, there are 20 feet of signal line cord, a feature which allows set-ups to be versatile.

E. There are easy-to-perform test procedures built into the unit which let users know whether the equipment is operating when it is set up and plugged in. If there is a malfunction, the entire unit is replaced.

Operation of ETN Station Equipment

During operation of the Edu-Com II, an incoming signal is amplified by internal electronics and three built-in speakers. This speaker-amplifier combination is capable of covering up to 200 people. The signal from the microphone is processed by additional electronics and sent out on the line to the local central office where the signal reverses its path back to Madison and all other ETN sites on the network.

Public Address Feature. Another aspect of this unit is a public address feature, which, built into the Edu-Com II, provides a psychological feedback mechanism to assist students in proper operation of the microphone. For best results, a student should speak in a normal voice, 4 to 6 inches away from the microphone. If the user speaks too loudly or moves in too close, an annoying, distorted sound is produced which forces him away. If the student gets back too far, people will not be able to hear him over the network, and he

will automatically move forward until he reaches the optimum distance. At that point, he can hear his voice coming out over the speakers.

The incoming signal level for this system is standardized for all stations and guaranteed by the telephone company. The public address level is a function of this incoming signal level, which rides above the level of the PA feature throughout the range of the level control. If a malfunction occurs, and a low signal level is produced at one of the ETN locations, the natural reaction of the user is to turn up the program level control in order to hear. In doing this, he finds that, the first time he attempts to speak over the set, it will howl, squeal and disrupt the program.

If this happens, the "public address feature" switch located on the back panel should be moved from normal to defeat. Moving this switch to the defeat position eliminates the public address feature thereby doing away with the interfering noise and enabling the program to continue. At the end of the program, the switch is returned to normal, and the low signal condition reported either over the network to the operator at the Madison center or by calling a toll free number for the telephone company toll center in Madison which is responsible for solving malfunctions on the ETN.

Transmission System. Before reporting further on the operation of this equipment, it is advisable to explain briefly how the signals get from location to location and how the Edu-Com electronics work. (Refer to the sketch.)

The signal originating from the ICS studios in Radio Hall is carried by wires to the Wisconsin Telephone Company's private line central office and test board located in Madison. From there it is distributed to regional telephone company long distance central offices located in various places in the state: Madison, Milwaukee, Racine, Appleton, Stevens Point, Eau Claire and Rice Lake. From these offices, it is further distributed to local conference bridge locations and from there relayed to various local central offices. Each station is connected to the local central office by wires which allow the signal to appear at jacks located in designated rooms at ETN sites.

Maintenance of ETN System

Trouble free service from a communications system this vast and complex doesn't just happen. It takes active participation by all involved, whether on the local level, with the telephone company, or at the Instructional Communications Systems studios in Madison. Those charged with the task of setting up, operating, and troubleshooting the various parts of the system, must become completely familiar with all its aspects. Participating telephone companies are responsible for the operation and maintenance of the interconnect system, while Local Program Administrators are obliged to see that the Edu-Com II station equipment is properly set up and used. To do this and to recognize when trouble occurs, they must become completely familiar with its operation.

Trouble Reporting System. The Edu-Com equipment was designed using the latest solid state technology to be as reliable as possible. Of course, anything of a technological nature can break down. For this reason, and because this unit is not handled by them, local telephone companies will not replace or repair the unit if it breaks. In many cases, they won't even acknowledge that it exists. To them it is considered customer owned and maintained equipment. If trouble with the unit occurs, the LPA notifies the ICS office in Madison where personnel see that it is replaced within 24 hours. Anticipating the time lag, the expense, and the effort needed to replace a unit, it was deemed important during the design phase of the Edu-Com II to build in test procedures to verify that a genuine problem with the unit exists. If the test procedures are performed and the unit does pass, it indicates that the unit is operating and that the trouble lies in the telephone company lines and interconnect devices throughout the state. Ninety-nine percent of the time the trouble is with the transmission system, so it is important that all LPA's become familiar with these testing procedures.

Loopback Test. The Edu-Com II is equipped with a voice switching feature. This device allows users to talk over an open microphone and hear others over a speaker at virtually the same time without squeal or feedback. If this mechanism breaks down, it will disrupt the operation of the unit and the network. It is the responsibility of the LPA to test this feature. On the back panel of the Edu-Com II is a slide switch marked loopback program and test. This switch ties the output signal from the microphone, which normally goes to the network, back into the receive side of the equipment. Actually, the entire set of electronics in the unit is being tested, right down to the signal line cord. This could be broken, cut or not plugged in, but that situation can be easily verified. To perform the loopback test, the LPA sets the program level control to about 6, removes the signal line cord from the ETN jack, takes a microphone and operates the loopback switch to the test position. This switch is spring loaded and, if it sticks in the test position, the unit will malfunction and disrupt the network. The tester then pushes the activate bar, speaks into the microphone and listens for two things: 1) his voice coming through the speaker broken up and distorted, and 2) a pumping action to the sound. As he speaks, a feedback ringing will disappear; when he stops, it reappears. If these two conditions are met, the equipment has passed the loopback test and is operating properly. This enables the LPA to tell the telephone company via the toll free call or the operator in Madison that "my equipment is OK. The trouble must be with the telephone lines."

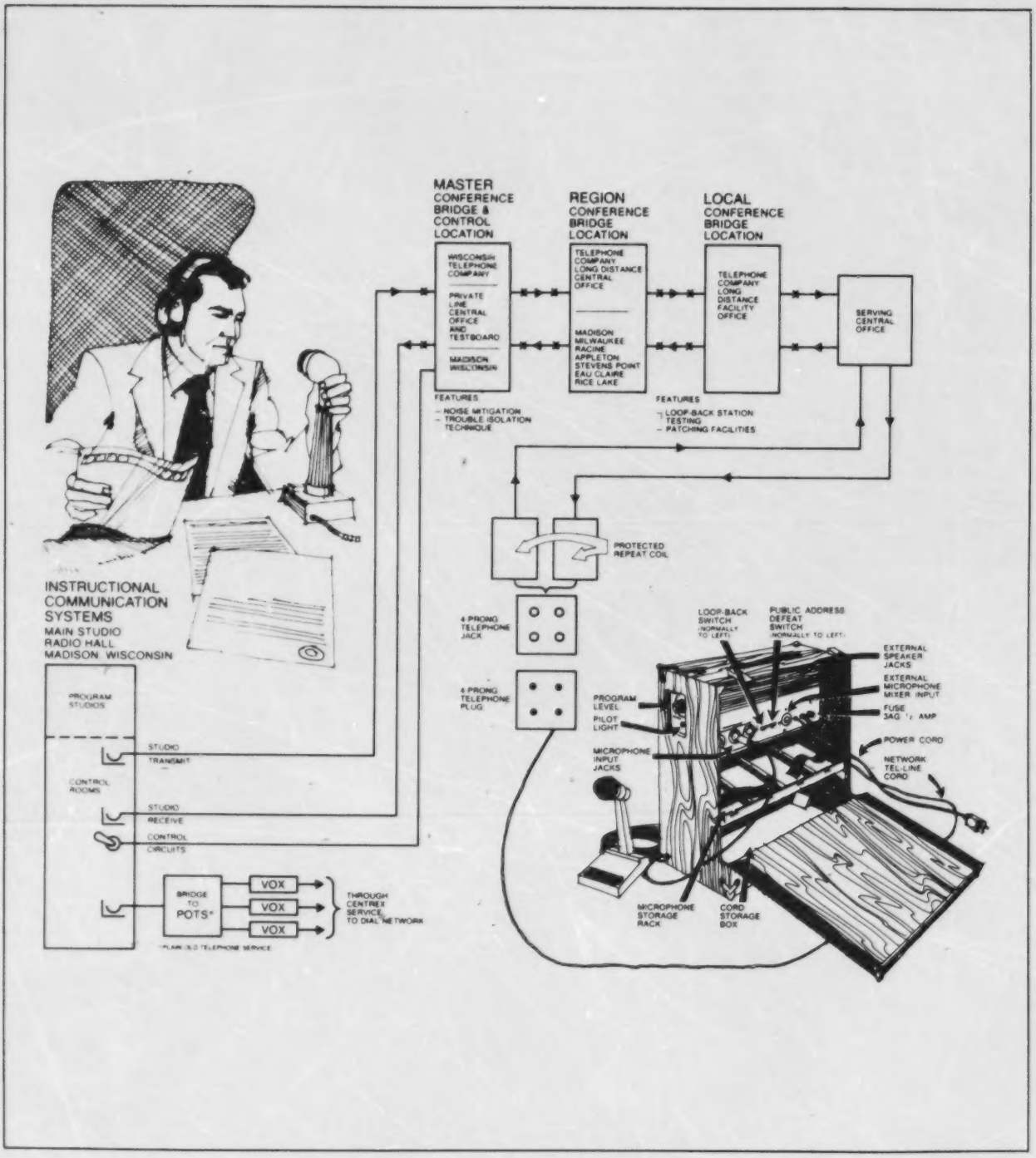
Additional Plug-In Modular Equipment

When it is needed, the auxiliary mic preamp jack allows the extension of another four microphone capability to the unit. In addition, there are two jacks for external speakers. For those locations that have a very large lecture hall, a column speaker can be provided to give depth and additional coverage not available with the built in speakers.

Additional microphones are also added when a large group is participating at one location. The mics simply plug into the base station equipment.

Advantages of ETN-SEEN Systems

Response to the Educational Telephone Network and Statewide Extension Network in Wisconsin has been varied but generally favorable. Our clients like the networks, originally because of the novelty, but as evidenced by their continued participation, probably because of the convenient access to teaching


MASTER
CONFERENCE
BRIDGE &
CONTROL
LOCATION
REGION
CONFERENCE
BRIDGE
LOCATION
LOCAL
CONFERENCE
BRIDGE
LOCATION
WISCONSIN TELEPHONE COMPANY
PRIVATE LINE CENTRAL OFFICE AND TESTBOARD
MADISON WISCONSIN
TELEPHONE COMPANY LONG DISTANCE CENTRAL OFFICE
MADISON
MILWAUKEE
RACINE
APPLETON
STEVENS POINT
EAU CLAIRE
RICE LAKE
TELEPHONE COMPANY LONG DISTANCE FACILITY OFFICE
SERVING CENTRAL OFFICE
FEATURES
– NOISE MITIGATION
– TROUBLE ISOLATION TECHNIQUE
FEATURES
– LOOP-BACK STATION TESTING
– PATCHING FACILITIES
INSTRUCTIONAL COMMUNICATION SYSTEMS
MAIN STUDIO
RADIO HALL
MADISON WISCONSIN
PROTECTED REPEAT COIL
4 PRONG TELEPHONE JACK
4 PRONG TELEPHONE PLUG
PROGRAM STUDIOS
CONTROL ROOMS
STUDIO TRANSMIT
STUDIO RECEIVE
CONTROL CIRCUITS
BRIDGE TO POTS*
VOX
VOX
VOX
THROUGH CENTREX SERVICE, TO DIAL NETWORK
*PLAIN OLD TELEPHONE SERVICE
LOOP-BACK SWITCH (NORMALLY TO LEFT)
PUBLIC ADDRESS DEFEAT SWITCH (NORMALLY TO LEFT)
EXTERNAL SPEAKER JACKS
EXTERNAL MICROPHONE MIXER INPUT
FUSE 3AG 1/4 AMP
POWER CORD
NETWORK TEL-LINE CORD
PROGRAM LEVEL
PILOT LIGHT
MICROPHONE INPUT JACKS
MICROPHONE STORAGE RACK
CORD STORAGE BOX

resources. The real significance of the ETN-SEEN systems is not the statistical analysis, but rather in its special capabilities:

- It provides for truly "continuing" education, enabling participants to receive limited amounts of information frequently. This allows students to assimilate the new information into their daily activities. With some of the more traditional forms of continuing education, where they receive massive doses of information once or twice a year, there is doubt that much of it is effective.

- There is great economy in time and money for the participants and the faculty. Neither is required to travel significant distances or spend large amounts of time away from occupational or teaching responsibilities.

- Departments are able to reach entirely new audiences which had been neglected previously. For example, each month a program is offered to 400-500 housekeeping personnel and 300-400 food service workers in 70 hospitals. Prior to this there were no continuing education programs offered to these personnel in Wisconsin and, if there had been, it is doubtful whether hospitals would have released them from their responsibilities and paid their expenses to travel to traditional courses.

- ETN-SEEN enables us to reach isolated professionals who would otherwise be in an educational vacuum. Professionals have indicated they would not have settled in small Wisconsin communities if it had not been for the availability of continuing education provided by ETN-SEEN.

- The public relations aspects of the media are significant. The programs presented via the ETN-SEEN systems offer tangible evidence that the University is vitally concerned with the day-to-day problems of professionals and consumers, as opposed to the more esoteric research which may eventually filter down to the local level.

With the proper planning and a little imagination teleconferencing systems can meet many educational needs. What are yours?

The next sections of the Wisconsin teleconferencing story are told in papers including:

1. operational procedures,

2. teaching techniques, and

3. technical systems.

Footnotes

[1]"The Telephone Will It Succeed? An 1880 Report," The Videocassette and CATV Newsletter, July, 1975, pp. 10-11.

[2]This conference took place in 1967, the ETN system consisted of 48 locations, necessitating travel for some faculty as they did not have a location in their office facilities.

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OPERATIONAL ASPECTS FOR PROGRAM PLANNING

Millie Seaman
Program Coordinator
Instructional Communications Systems
University of Wisconsin-Extension

Reprinted from The Status of the Telephone in Education, University of Wisconsin-Extension, May, 1976.

In 1968, a report of the ETN/SCA Extension Advisory Committee was mailed to the University of Wisconsin-Extension specialists outlining the procedures and guidelines for using a new media called the Educational Telephone Network. At that time, three years after its birth, ETN linked 56 courthouses, 48 hospitals and 11 UW Campuses, and was being used extensively by the School of Medicine and the School of Nursing. This system was also employed by the Extension Division of Community Programs for its weekly statewide staff conferences. The Advisory Committee's report encouraged further use of this new media by Extension faculty as an alternative to traditional face-to-face meetings in order to reduce travel and still reach widely scattered audiences.

This encouragement resulted in a surge of ETN programming during the next year. Scheduling and promotion of ETN programs by Extension faculty caused considerable concern in the County Extension Offices, placing heavy demands on the county faculty and their facilities. To meet these demands, the ETN Advisory Committee (the Anderson 1 Committee) came up with recommendations which are the basis of ETN procedures used today. Before examining how these guidelines currently function, it seems beneficial to take a brief look at the history of their development.

When it became apparent that planning and coordinating the programs to be presented on the Educational Telephone Network was a complex task, the ETN Advisory Committee made the following suggestions:

1. Appointment of the County Extension Office Chairman as Local Program Administrator (LPA) at a location, with operation of facilities coordinated with the District Director.
2. Use of a centralized registration system.
3. Responsibility for promotional materials with the programming unit.
4. Instructional approval of programs transmitted.
5. Submission of program listing 60 days prior to semester instruction.
6. Adoption of subcommittee ETN handbook incorporating committee recommendations.

In 1971 an ETN Advisory Committee (the Anderson 2 Committee) was appointed by the Dean of Extension for the purpose of exploring and re-examining previous guidelines established for network operations. This committee came up with the following major recommendations:

1. Coordination of network programs by a faculty person in each county, appointed by the District Director on a yearly basis, and put into writing.
2. Use of ETN limited to Extension-sponsored programs.
3. Locations under the jurisdiction of Extension faculty for security reasons.
4. Scheduling procedure to be on annual basis.
5. Meeting with programmers for program planning on a semester basis.
6. Enforcement of criteria and guidelines with programmers.

It should be pointed out that the Advisory Committees incorporated a broad-based faculty representation from all Extension divisions who were associated with ETN programming. Through the ideas and recommendations of these committees over the ensuing year, the policies and procedures for implementing programs on the network took shape.

The procedures and guidelines are outlined here as they have evolved through the committee recommendations, and as they are used today by Extension programmers in implementing their programs. These procedures apply specifically to general types of programs, that is, non-credit and credit programs involving registration. Steps followed to implement medical programs at hospital locations, and public service programs, such as agent training, committee meetings and conferences without registration, are modified to accommodate those types of programs. Therefore, with the large variety of programs, procedures do not follow a rigid pattern; they are tailored to particular needs. Let us now consider the specific steps taken in setting up a program for ETN.

The Planning Process

Scheduling

It all begins each January at the annual scheduling meeting. Prior to the meeting, a letter is mailed to Extension programmers and users inviting them to attend and requesting information about their program needs on the network for the upcoming academic year. Their program requests for network time are then submitted to Instructional Communications Systems (ICS), one to two weeks before the meeting date. These are sorted out, using established

guidelines, and pre-plotted on master schedules before the actual meeting. Adjustments are made in the requests when preplotting in order to best utilize the network hours, and to resolve conflicts before the meeting. Adjustments are not made arbitrarily, but are checked out with the programmer by telephone. It is at the actual meeting, however, that the programmers have the opportunity to see how their programs fit in relation to others, to negotiate time, if needed, and to firm up their schedules. Departments that cannot work out scheduling difficulties are referred to an Advisory Committee to resolve them. (This has not become a necessity as yet.) Within a couple of weeks after the meeting, all requested network time is double checked and confirmations mailed to the network programmers.

Although requests for network time can be made during the year, after the annual scheduling meeting, by then, prime time (4:30-10 p.m.) is no longer available unless there has been a cancellation. Unscheduled network time is most often used later by Extension faculty for committee meetings or by Extension agents for discussion of current topics and issues.

Departments that do not use the times reserved, and that do not give 90 days notice are assessed $100 per hour for unused time. With 90 days notice, another department has ample time to plan a program.

The networks are operational September through May from 7 a.m. to 10 p.m., Mondays through Fridays, and from 8 a.m. to 12 noon on Saturdays. Based on figures from the last annual meeting, the network is used approximately 55% of the time. Unused network time appears mostly to be mornings from 7 to 8:30, scattered afternoon slots, Friday evenings, and Saturdays. Basically, all prime time is now being scheduled, and there are more requests than there is time available. Programs vary in length ranging from one-half to three hours, but most run one to one and one-half hours. The number of program sessions also varies considerably, the most common being the weekly or bi-weekly general type of program. However, the range includes the daily Community Programs Message Service for statewide Extension faculty and the monthly Continuing Medical Education Programs which run the full year. These various types of programs are covered in other papers.

Meeting with Programmers

Once the programs have been scheduled, the next step in the planning process is for the programmers to meet with the Instructional Communications Systems faculty. This meeting is usually arranged by the ICS Office approximately three months before the first program date, in order to discuss the program objectives, exchange ideas and to give assistance with the overall planning of the program. About four years ago a slide presentation on program planning procedures was introduced and used at each meeting. During the last year, this presentation was developed into a 20-minute video tape entitled "Helping ICS to Help You." We have found the video tape an invaluable aid to programmers because it illustrates the many elements involved in the planning process, including the web of Extension support activity so essential in planning a successful program. In addition, a brochure on planning procedures has been written as a guide for programmers. (Exhibit 1)

When meeting with department programmers, the ICS staff makes these assumptions:

1. that the program meets the criteria established for use of the network;

2. that the programmer is responsible for determining the need and content of the program;

3. that we do not attempt to make any program judgements;

4. that we provide assistance in the areas of program format, media presentation and technical know-how.

Basically, the meeting sets out to establish an operational plan with deadlines and considerations, such as:

- IDENTIFYING THE TARGET CLIENTELE: Justification of how and why ETN meets program and clientele needs

- ESTABLISHING A BUDGET: Program materials, mailings, production, support staff, honorariums for speakers, people needed to make the program successful and arriving at a program fee

- PLANNING PROMOTION AND PUBLICITY: Brochures, when and to whom, assistance from Program Information with press releases, radio spots, feature stories, radio-TV appearances.

- PLANNING A PRODUCTION TIMETABLE: Pre-recordings, telephone tie-ins, remote program originations, A-V materials, cassette packaging

- OBTAINING INSTRUCTIONAL APPROVAL: Department Chairman and Divisional Dean

- REGISTRATION PROCESS INVOLVED

- EVALUATION INSTRUMENT TO BE USED

- PROGRAM MATERIALS: Handouts, books required, estimated and ordered

- COURSE DESIGN TO BE FOLLOWED

- STATION SELECTION: Statewide or selected locations

Program Initiation

The decisions reached in the operational planning meeting are confirmed by the ICS Program Coordinator in the form of a Program Initiation Request, (Exhibit 2) which serves as the official contract between the sponsoring department and ICS. Formalizing these commitments alerts the people involved in the planning, production and registration areas. Programmers who have used the network before and who plan to offer the same program, need not necessarily meet each semester. A standard information sheet has been devised for programmers to complete and return which establishes the operational plan. A follow-up phone call usually is all that is required to confirm program commitments. We place particular emphasis on personal contact and a good working relationship with the programmer, not only in the initial planning phase, but throughout the duration of the program.

UWEX

UNIVERSITY OF WISCONSIN–EXTENSION

etn educational telephone network
sca subsidiary communications authorization
seen statewide extension education network

planning procedures for etn·sca·seen programs

1. Reserve Time on the ETN/SCA/SEEN Systems
   (Use limited to Extension-sponsored programs)
   a. Attend annual department scheduling meeting to reserve time 9 months in advance.
   b. Programs with registration should be scheduled 90 days in advance. Contact the Instructional Communications Systems (ICS) office at 262-4342.
   c. Public service programs should be scheduled at least 30 days in advance.

2. Obtain Instructional Approval
   -Approval by department chairman and divisional dean is required for services necessary during the presentation of the network program.

3. Design program with Instructional Communications Systems staff
   a. Schedule a program design meeting with ICS staff 90 days prior to the first program. This meeting will assist in the overall design of the program.
   b. Have instructional approval number prior to program design meeting.
   c. Design meeting will include:
      -Stating the objectives
      -Identifying the audience
      -Planning a production timetable
      -Establishing a media presentation
      -Formulating a budget for the program
      -Establishing a registration procedure
      -Planning publicity
      -Evaluating the program

4. A Program Initiation Form is completed by ICS after the design meeting. This is an agreement of program arrangements with the program department and ICS. Copies of the agreement are distributed to the department coordinator, the ICS production coordinator, the systems engineer, and Student Services.

PUBLICITY & PROMOTION

Program Announcement
-Prepared by ICS program coordinator in conjunction with the program department – establishes formats for publicity and registration.
-Sent directly to all LPAs 60-90 days in advance of the program.
-Includes pertinent information on program, such as: title, dates, time, department coordinator, clientele, course description and materials, publicity, registration and station selection.
-Refusal postcard enclosed for LPAs to return within 2 weeks if network facilities will not be available.
-ICS program coordinator sends listing of confirmed network locations to program department and Student Services. With this, the program department's brochure can be finalized.

Brochures
-Prepared by program department
(Allow 6 weeks to reproduce)
-Includes program information, registration form and address panel.
-Contact publications editor for assistance in layout, editing and direct mail (Ray Duerst, 2-8940).
-Proof of brochures must be checked by ICS or publications editor.
-Mail brochures 1 month before initial program to:
a. clientele groups
b. LPAs (10-15 copies with letter informing them which clientele groups were reached)
c. ICS Office (10 copies)

News Releases
-Prepared by Extension Public Information Office and sent to the county offices 1 month before the first program, allowing counties time to localize and send to news media.

Community Programs Broadcasts
-Departments have the opportunity to talk about upcoming programs on the weekly Monday a.m. faculty conference broadcasts. Call the C.P. Office at 263-2733 to schedule presentations.

Radio & TV Spots
-County offices should send news releases to radio and TV stations in their area.
-Appearances on radio and TV interview programs can be arranged through the ICS Office.

Releases for Organization Bulletins
-Contact the Extension Public Information Office for assistance in writing bulletin releases.

Fliers
-Inexpensive handouts, prepared by ICS or counties, contain listings of upcoming ETN/SCA/SEEN courses each semester.

Posters
-Departments could use posters wherever distribution of fliers and brochures takes place and also for TV presentations.

EXHIBIT 1

PROGRAM INITIATION REQUEST (PIR)
ETN-SCA-SEEN

WEX

Department No. _____ Date _____

Instructional Approval No. _____

MEDIUM	STATION LOCATIONS	ORIGINATION POINT
____ETN	____Hospitals ____County/Campus Statewide	_____
____SCA	____Libraries ____Selected _____	_____
____SEEN		_____

PROGRAM _____

DATE(S) _____

TIME(S) _____

CLIENTELE _____

COORDINATOR _____ MODERATOR or INSTRUCTOR _____

ADDRESS _____ ADDRESS _____

TELEPHONE _____ TELEPHONE _____

REGISTRATION
FEE: $ _____
Pre Registration ☐ Yes ☐ No
Registration Deadline _____
____Conveners
____Public Service

SUMMARY OF REGISTRANTS OR NO. OF PARTICIPANTS
_____
TOTAL INCOME _____

PUBLICITY
- ☐ Brochure or Flier _____
- ☐ Press Release _____
- ☐ Feature Story _____
- ☐ Community Programs Newsletter _____ or Morning Broadcast _____
- ☐ Radio-TV Spots _____
- ☐ Program Announcement _____ Locations Established _____
- ☐ Other _____

PRODUCTION REQUIREMENTS
- ☐ Studio
- ☐ Remote
- ☐ DDD (Phone No. _____)
- ☐ Tape Inserts
- ☐ Tape Duplication
- ☐ Visuals
- ☐ A-V Equip. @ locations
- ☐ Course Materials

GENERAL PROGRAM DESCRIPTION

EVALUATION

COMMENTS

White–Program Coordinator / Goldenrod–Scheduling / Yellow–Programming Dept. / Blue–Registration / Green–Production

EXHIBIT 2

Program Announcement

Preparation of a Program Announcement is another activity generated by the operational planning meeting. The Program Announcement is prepared by the ICS Program Coordinator in conjunction with the department programmer to provide the Local Program Administrator (LPA) and network coordinators with pertinent information on the program. A schedule card is enclosed which must be returned within a given time, usually two weeks, if the network facilities cannot be scheduled. (Exhibits 3 and 4) When there are two locations in a city, for example, at a courthouse and on a UW campus, usually only one location is scheduled. It is the administrative responsibility of the LPA to determine location availability, and to use the schedule card to inform us at ICS accordingly. From the schedule cards returned, a listing of confirmed locations is sent to the sponsoring program department and the Registration Office which keeps a checklist for location requests. The program department then finalizes its program brochure identifying specific network locations. The Program Announcement, with its approximate 60-day lead time, gives the LPA's and the programmer ample time to properly schedule and promote the programs.

Promotion and Publicity

Newspaper Tabloid

Although the Program Announcement serves as the basis for promotion and publicity, the first piece of publicity on network offerings is in the form of a newspaper tabloid. (Exhibit 5) This contains a total listing of programs by department and includes dates, time, fee, clientele, and a general description of the course. In addition, there is a feature story describing the ETN system and photographs showing the equipment in use. Prepared by ICS, with assistance from the Program Information Office, the tabloid has proved to be an economical and convenient way of giving interested persons an overall view of upcoming programs on a semester basis. Last year a total of 60,000 copies were printed and mailed to the Local Program Administrators for distribution at county fairs, meetings, conferences, information booths and by general mailings to individuals requesting information on network programs. In one of the counties, the continuing education agent bulk mailed the tabloid to all names on their adult education list and had it distributed through the schools to teachers.

Brochures

The single most important tool for publicity is the brochure or individual flier on each program. Preparation of these is the responsibility of the programming department. Extension's Program Information Office assists the programmer in the design and editing of brochures, and has developed a standard format to prevent information from being omitted. (Exhibit 6)

Brochures include all pertinent facts needed to register for the class plus such information as purpose, method and structure of that particular program, and a brief description of ETN. One panel of the brochure always contains a confirmed list of ETN locations. This standardized list gives towns and cities alphabetically with specific locations noted for each city with more than one ETN center. Available locations are checkmarked, and those without a check are not available for that particular program. The LPA's telephone number is included next to the city listing in case the student wants further information. Such a standardized list is advisable to prevent constant retyping of the ETN locations list, as was the case before this panel was designed.

Considering all time factors, we recommend brochure copy be prepared at least two to three months in advance. Brochures are designed as self-mailers and are sent out by the departments using established mailing lists, about four weeks in advance of the program. Cover letters are mailed with copies of the brochure to the LPA's describing the clientele reached through their mailings, and assistance is requested in the distribution and promotion of the program at the county level. According to program evaluations, direct mail efforts scored highest as a means of informing participants of network programs.

Press Releases

The Program Information Office assists the programmers in writing all program news releases. One general round-up release is prepared at the beginning of each semester for programs offered that semester and sent to the LPA's who are asked to fill in blanks, have the story retyped and mailed to all the newspapers in the county. This initial story is followed up with shorter releases of similar formats on individual classes or groupings of programs which involve the same clientele, such as three courses for teachers. Releases in which LPA's have inserted their county names and network locations give a local touch which results in far greater usage than if the stories were mailed direclty to the newspapers. In addition the LPA's usually know the editors and columnists of their community papers, and will localize the releases readily. (Exhibits 7 and 8)

Radio Spots

Radio spots are prepared by the Program Information Office on programs with general appeal, such as "Law for the Public" which is aimed toward a broad group of people, impossible to reach except through the media. Radio spots also might be prepared on education courses since the Education Department cannot afford to send direct mail pieces to all the teachers in the state or to all interested parents.

Feature Stories

Another means of promoting programs is through feature stories. Last year the Program Information Office wrote one such story about a woman who took an ETN "Article Writing" course and how one of the stories she wrote for the class was bought by Reader's Digest. Stories are also written about new network locations and special programs, like the "Piano Teacher's Forum" which introduced music to the ETN system.

Newspaper Advertising

Three years ago funds were given to Program Information to conduct an experimental project of advertising for ETN programs. Ads were placed in all the newspapers in three counties, and a check was run to see if ETN enrollments increased at a greater rate in those counties than in other counties around the state. The experiment seemed to bear this out, however, the cost for 29 ads was over $1,000, and funds just were not available to place the ads statewide.

ETN-SCA #70
PROGRAM ANNOUNCEMENT

UNIVERSITY OF WISCONSIN—EXTENSION
Instructional Communications Systems

Old Radio Hall, 975 Observatory Drive, Madison, Wisconsin 53706 (608) 262-4342

TO: Local Program Administrators
FROM: Millie Seaman, Program Coordinator
DATE: November 5, 1974

PROGRAM TITLE: POLITICAL ADVERTISING & PUBLIC RELATIONS

DATES: 1975 January 23, 30
February 6, 13

TIME: 8:00 - 10 p.m. (THURSDAYS)

DEPARTMENT: Communication, UWEX

COORDINATOR: Therese R. Binder
Communication, UWEX
222 Lowell Hall
Madison, WI 53706
PHONE: 262-3982

CLIENTELE: Ad Club Members; PRSA Wis. Cahpters; Lobbyists; State & Local Legislators, League of Women Voters; Leadership in Rep. & Dem. Parties; Wis. Broadcasters Assn. members; Pages at Capitol & Admin. Assistants

PROGRAM DESCRIPTION: Our political system is writhering with public criticism and cynicism. A clean campaign needs direction from communication professionals. Therefore, this course, taught by Wisconsin political PR and advertising people will help teach people the steps in planning a limited political campaign complete with press conferences, press releases, and fund raising. Probable major topics: Creating a Superman - Image Building on Performance; How to Plan a Political Campaign; Techniques of Fund-Raising; Political Polling with Survey and Campaign Uses; Campaign Reform Laws and the Media.

REGISTRATION: **FEE: $15.00**
Registrants are to complete enrollment form and mail together with correct fee to: (check or money order made payable to UW-Extension)

ETN REGISTRATION
432 N. Lake St., Room 101
Madison, WI 53706

SCHEDULE CARD
Instructional Communications Systems

OVER -------

Program or Course Title _____

City _____ LPA _____

WE DO NOT INTEND TO COMMIT FACILITIES AT
(LPA's with multi-locations, select locations not to be scheduled.)

Courthouse Library
Campus Center

EXHIBIT 3 (above)

EXHIBIT 4 (left)

COMMENTS

UWEX

University of Wisconsin-Extension

Instructional Communications Systems 1975-76

10th Anniversary of Statewide ETN

Your Open Line to the University

When the first telephone was being installed in this country about 100 years ago, its users were lucky to hear someone speak from only a mile away. At that time, few people would have envisioned the telephone's use in what has become the Educational Telephone Network (ETN) of University of Wisconsin-Extension.

ETN itself has come a long way from that first telephone. It started in 1965 with only 18 listening sites around the state. The few listeners might hear the lecture quite clearly one minute, then hear nothing but static the next. As a result, some say telephone repairmen were seen in ETN Madison offices as often as the ETN staff!

While it was up to the telephone company to work out the technical bugs, it was up to the ETN staff and UW-Extension faculty to work out the program details.

The first program was a seminar for physicians, a group that needed classes in order to learn of the latest medical wonders but couldn't afford the time to travel far from their patients.

This first class was a hit and ETN was on its way. The next year, three new health programs were scheduled and the decision was made to start programs for other professionals.

Lawyers, for instance, attended ETN noon lectures while they ate their sack lunches. Over the years, they have had one of the highest turnouts of any group—about 500 per program.

their class assignments to their instructor who critiqued and returned them.

Music was harder to adapt to the system, since it requires a higher level of sound quality than a lecture. The test came in the spring of 1973 with a forum for piano teachers. Artists from as far away as Texas and New York performed—via the telephone lines—and listeners were surprised at the almost concert-hall quality of the sounds. Teachers demanded an encore and the program has been repeated the last two years.

Today ETN is celebrating its tenth anniversary and there are now over 100 UW-Extension courses offered each year to more than 20,000 participants.

A new dimension was added to the ETN idea in 1969 when images could be transmitted along with the telephone lecture. In fact, an additional system was designed and called SEEN, or the Statewide Extension Education Network. With SEEN, the images appear on a screen at the listening site at the same time that the lecturer draws them on an electrowriter. SEEN has made it possible for UWEX faculty to teach calculus, for example, because they can now send out instant equations and formulas. So far, 23 cities have the capability to receive SEEN programs.

New technology will no doubt bring more changes like SEEN. But it's really people like you who will determine the future directions of ETN's programs and use—the adults who ask for educational experiences and the UW-Extension faculty who respond . . . by phone.

Would Alexander Graham Bell believe . . .

. . . This is where his telephone led?

EXHIBIT 5

ETN REGISTRATION

☐ YES! Register me for *Science Fiction: Keeping Up With Change—Through Imagination, II.* March 22, 29, April 5, 12 & 14, 1976, from 8 to 10 p.m.

☐ Enclosed is my check for $12, payable to UW-Extension.

Name_____

Street Address_____

City_____ State_____ Zip____

Home phone_____

Business phone_____

Soc. Sec. No. _____-_____-_____*

Location you wish to attend is:

_____

(Select from list at back of brochure.)

*Not *mandatory*—*used only to insure accessibility and accuracy of your educational record.*

---------- Clip & mail today! ----------

etn

Unless otherwise specified, there is one ETN location in each of the towns listed below. For further information, call the phone number given after the location you wish to attend.

- ALMA, 685-4560
- ANTIGO, 623-7601
- APPLETON, 739-7741
- ASHLAND, 682-2806
- BALDWIN, 684-3301
- BALSAM LAKE, 485-3136
- BARABOO
  - Courthouse, 356-5581
  - UW Center, 356-5581
- BARRON, 537-3124
- BELOIT, 752-7471
- BLACK RIVER FALLS, 284-5391
- CHILTON, 849-2361
- CHIPPEWA FALLS
  - Courthouse, 723-9195
  - Library, 723-1148
- CRANDON, 478-2212
- DARLINGTON, 776-4494
- DODGEVILLE, 935-3354
- DURAND, 672-8864
- EAGLE RIVER, 479-4797
- EAU CLAIRE
  - Courthouse, 839-4712
  - UW Campus, 836-3269
- ELKHORN, 723-4900
- ELLSWORTH, 273-4376
- FOND DU LAC, 921-5400
- FRIENDSHIP, 339-7811
- GREEN BAY
  - Courthouse, 432-3211
  - UW Campus, 465-2139
- GREEN LAKE, 294-6571
- HAYWARD, 634-4876
- HUDSON, 386-5581
- HURLEY, 561-2695
- JANESVILLE
  - Courthouse, 752-7471
  - UW Center, 752-7471
- JEFFERSON, 674-2500
- JUNEAU, 386-4411
- KENOSHA
  - Health & Soc Ser Cntr, 658-2044
  - UW Parkside, 553-2312
- KESHENA, 799-3641
- KIMBERLY, 788-2542
- LA CROSSE
  - Courthouse, 784-9494
  - Library, 784-8623
  - UW Campus, 784-9494
- LADYSMITH, 532-5539
- LANCASTER, 723-2125
- MADISON
  - Library, 266-6388
  - Ag Hall, 262-4342
  - W[illegible] Center, 262-1122
- MANITOWOC
  - Co Off Bldg, 682-8877
  - Library, 682-6861
  - UW Center, 682-8251
- MARINETTE
  - Courthouse, 735-3371
  - UW Center, 735-7477
- MARSHFIELD, 387-1147
- MAUSTON, 843-1341
- MEDFORD, 748-1327
- MENASHA, 734-8731
- MENOMONEE FALLS, 251-4010
- MENOMONIE
  - Courthouse, 232-1636
  - UW Campus, 232-1636
- MERRILL, 536-7151
- MILWAUKEE
  - Civ Cntr Campus, 224-[illegible]
  - Co Ext Off, 257-5151
- MINOCQUA, 356-5296
- MONROE, 325-5181
- MONTELLO, 297-2141
- NEILLSVILLE, 743-3118
- NEW RICHMOND, 246-2164
- OCONTO, 836-5322
- OSHKOSH, 235-2500
- PHILLIPS, 339-2555
- PLATN, 568-4201
- PLATTEVILLE, 342-1373
- PLYMOUTH, 458-5566
- PORT WASHINGTON, 284-9411
- PORTAGE, 742-2191
- PRAIRIE DU CHIEN, 326-8614
- RACINE, 637-8585
- REEDSBURG, 524-3316
- RHINELANDER, 362-6314
- RICE LAKE, 234-8176
- RICHLAND CENTER, 647-6148
- RIVER FALLS, 425-3877
- SHAWANO, 526-6136
- SHEBOYGAN
  - UW Center, 458-5566
  - Library, 457-5583
- SOUTH MILWAUKEE, 762-8692
- SPARTA, 269-6718
- SPOONER, 635-3192
- STEVENS POINT, 346-3573
- STURGEON BAY, 743-5511
- SUPERIOR, 394-0361
- VIROQUA, 637-2185
- WASHBURN, 373-2221
- WAUKESHA
  - Courthouse, 544-8080
  - UW Center, 542-8825
- WAUPACA, 258-7681
- WAUSAU
  - Courthouse, 842-2141
  - UW Center, 845-9602
- WAUTOMA, 787-2226
- WAUWATOSA, 258-5700
- WEBSTER, 866-4201
- WEST ALLIS, 476-6550
- WEST BEND
  - Courthouse, 334-3491
  - UW Center, 338-1161
- WHITEHALL, 538-4341
- WHITEWATER, 472-1100
- WINTER, 266-3301
- WISCONSIN RAPIDS, 423-3000

UW-Extension provides equal opportunities in employment and programming.

dealing with DEADLINE

HUMANISTI
MIDDLE AG

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SERIES BR

UNIVERSI

WUEX
UNIVERSITY OF WISCONSIN—EXTENSION MUSIC

in cooperation with the
State of Wisconsin Department of Public Instruction
and in association with
Wisconsin Music Educators Conference
Wisconsin School Music Association
presents

Boys Can and Want to Sing

Three Tuesdays, 6:30 - 7:50 p.m.
January 13, 20, 27, 1976
Via ETN in Every County in Wisconsin

EXHIBIT 6

WISCONSIN
Newspaper Association
33 North Dickinson
Madison Wis 53703
Clipping Bureau Division

Eau Claire
Leader Telegram

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Plan Second Semester County ETN Courses

Varied courses offered through Extension ETN

Classes will again be offered by University of Wisconsin-Extension over the Educational Telephone Network (ETN) starting this month at the Eau Claire County Courthouse.

The following courses are available in Eau Claire and other counties through the county extension agent:

Business and Management: creating real estate sales, Jan. 19; Wisconsin real estate law, Feb. 7.

Communication: Cable TV-Video projects, Jan. [illegible]

Engineering: retail advertising, Feb. 4; introduction to statistical methods, Jan. 26; metric system, Jan. 27; pavement design, Jan. 12; alternate sources of energy—wind power, Jan. 29; mechanical engineering refresher, Feb. 2; microprocessors and industrial application—survey of structural analysis, Jan. 29; products liability—engineering and the law, Feb. 3; introduction to aquatic chemistry, March 10; psychrometric processes, Feb. 9; sales techniques for engineering pro-

[illegible] ting dates for January [illegible] ed by interest groups.

[illegible] anagement: Creating [illegible], Jan. 19; Wisconsin [illegible] Feb. 7.

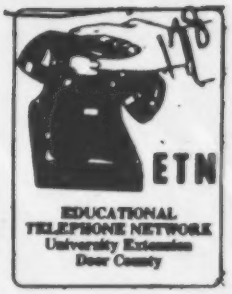
[illegible]: Cable TV-Video [illegible] A Weekly Diet of PR, [illegible]spaper Financial [illegible]ditors and Publishers, [illegible] Photographic Works, [illegible] Article Writing, Feb.

ings, March 29.

English: teaching creative writing, Jan. 15.

Beekeeping: working with bees for fun and prof-

178



For the music student in Door county's schools, a career in music is no longer confined to teaching and performing.

Music teachers, counselors,

ETN celebrates 10 years

Ozaukee County is plugged into what is often referred to as "the world's biggest party line," UW-Extension's Educational Telephone Network (ETN). This year the ETN is celebrating its 10 year anniversary.

Each year more than 30,000 Wisconsin citizens participate in educational

country about 100 years ago, users were lucky to hear someone speak from only a mile away. At that time few people would have envisioned the ETN program, which began in 1965 with only 18 listening sites around the state.

At last count there were 186 locations in courthouses, hospitals, and

local program administrator for the network.

ETN programs range from music instruction to law. Law courses have been developed for laymen as well as for lawyers. Health and social work professionals and businessmen and women are also heavy users of the University telephone system.

"In the last couple of

EXHIBITS 7 & 8

NEWS from WLEX

UNIVERSITY OF WISCONSIN-EXTENSION
Program Information, 625 Extension Building
432 North Lake Street, Madison, WI 53706
(608) 262-1156 or 262-0074

3/17/76

immediately

JRW

LPA's--Please fill in blanks, have retyped on your newshead and mail to area press.

Jeanne Weber

_____ -- A seminar for _____ county attorneys, "Tax
(your city)

Aspects of Contributions to Charitable Organizations," will be conducted over the University of Wisconsin-Extension Educational Telephone Network (ETN) four Wednesdays starting April 7.

The sessions will be held from 12 noon to 1:20 p.m. and will be repeated at 4 p.m. for persons in the Milwaukee and Madison areas. Persons in _____ County can participate in the ETN meeting room at _____, _____,
(building) (address)

_____.
(city)

The sessions will examine the federal and state tax problems arising from gifts to charitable organizations, both from the view of the donor and the organ-

Based on a questionnaire to LPA's on the issue of advertising, there appear to be many pros and cons. Several of the LPA's replied that when they ask for so much free space the editors expect or would appreciate advertising. On the other hand, LPA's replied that if they start to advertise, papers will question why they should use the news releases when they can get paid. Others noted that, when ETN can get 50-80 free stories used, why change?

Posters

Use of posters also is recommended to attract attention and to obtain enrollment. One of the Wisconsin libraries recently designed an attractive poster with a pocket on it for the descriptive program brochures which was displayed in the entrance area of the library with good effect.

In-House Promotion

There are a number of in-house channels that Extension uses in publicizing ETN programs. One is the Community Programs Newsletter to Extension faculty in which program reminders can be made. Another channel is the weekly ETN faculty conference. Here programmers have the opportunity to call their program to the attention of Extension faculty statewide and to discuss its subject matter with them. There is also the Weekly Schedule of network courses which is prepared by ICS two weeks in advance of the program transmissions. (Exhibit 9) It includes information such as topic, clientele, coordinator, system used, if pre-registration is required and if a fee is charged. It is mailed to the Local Program Administrators for posting on bulletin boards, and, in some cases, used as a release to newspapers.

Local County Promotion

The Local Program Administrators play a key role in the promotion and publicity of network programs. They are instrumental in assisting programmers in the direct mail efforts in areas such as:

1. Mailing brochures to people in their counties such as all previous ETN enrollees, homemakers, 4-H leaders and persons who have taken other Extension courses.

2. Distributing brochures and newspaper tabloids to public places such as doctors' and dentists' offices, barber and beauty shops, banks, libraries, post offices, hospitals, YMCA's and YWCA's. Asking supermarkets to stuff them in grocery bags.

3. Speaking to civic groups about ETN.

4. Using radio or TV programs to plug the programs. (Some of the agents have their own weekly programs.)

5. Utilizing shoppers guides for releases or a listing of the upcoming ETN programs.

6. Contacting heads of institutions or organizations to alert them to the programs, and supplying them with brochures.

Through the various Madison Extension offices, the LPA's are provided with the basics of promotion which allow them to carry out their responsibility for promotion and publicity of network programs.

Registration

In the web of Extension support activities is the Central Registration Office in Madison. Most network registrations, with some exceptions, are processed here, and funds generated from the programs are deposited into the sponsoring department's account. Most of the registration is done by mail in advance of the first program through enrollment forms provided in the program fliers. Completed enrollment forms are either left with the county Extension agent who forwards them to Madison, or mailed directly to the Madison Registration Office with the correct fee. (Exhibits 10 and 11) Copies of the registration form are sent to the registrant, the programming department and the location selected by the enrollee.

A registration summary is given on the network the morning of a beginning program series. In cases of late registrations, locations are notified by telephone so that facilities are made available.

For public service programs which do not involve official registration or fees, attendance reports are completed at the locations. These usually are mailed as an attachment to the Program Announcement and returned to the ICS Office. A standard University Extension attendance report is also used at the locations, and we encourage the LPA's to keep track of attendance for all programs whether it be a fee or public service program.

Registration for Medical Programs is handled somewhat differently. Hospitals contract for ETN on a yearly basis, offering scheduled programs to members of their staff at no charge. Individual registrations are accepted, however, at any of the hospital or county locations, and then the standard registration procedures apply.

Production Services

Program instructors are contacted well in advance to explain production capabilities, to arrange for a demonstration of equipment (for those unfamiliar with this teaching media), and to confirm the production arrangements needed to meet the instructor's plans for the course. Among the production services available to faculty are:

- FACULTY PRODUCTION LAB: A workshop area where faculty may use cassette and reel tape machines, turntable and telephone for easy and convenient recording, editing and listening to program materials.

- U-TAPE-IT STUDIO: A self-operated, push-button control studio in which faculty record lecturers and interviews.

- STUDIO RECORDING AND EDITING: A technician-controlled production service available for single-voice and multiple-voice recordings, such as for role playing and panel discussions. Editing assistance is also available.

- TELEPHONE TIE-INS: Up to six different resource persons or groups may be connected to network programs via telephone calls placed from the master control board.

ETN-SCA WEEKLY SCHEDULE

April 12 - April 16, 1976

UNIVERSITY OF WISCONSIN–EXTENSION
Instructional Communications Systems
Old Radio Hall, 975 Observatory Drive
Madison, Wisconsin 53706 262-4342 Area Code 608

NOTE: Numbers refer to Program Announcement

DAY	TIME	TOPIC	CLIENTELE	COORDINATOR	(1)	(2)	(3)
MONDAY April 12							
	9:00am 9:30am	CP Staff Conference	CP Staff	Woeste/Hegge	ETN/ SCA	no	no
	9:30am 9:55am	CP Daily Information	CP Staff	Woeste/Hegge	ETN/ SCA	no	no
	10:00am 11:50am	Family Development Dept. Faculty Mtg.	Ext. Faculty	N. Musser	ETN	no	no
	Noon 12:50pm	Ext. Nursing Faculty Mtg.	Ext. Nursing Faculty	S. Cooper	ETN	no	no
	1:30pm 2:20pm	WINS #5	Inactive Nurses	R. Lutze	ETN/ SCA	yes	yes
	2:30pm 4:20pm	Prog. Dev./In-Service Ed. #13	Co. Ext. Home Economists	R. Stare	ETN	no	no
	4:30pm 5:50pm	Career Education #78	All Educators	Ferver/Coenen	ETN	yes	yes
	6:00pm 7:50pm	The School & The Law #83	Teachers, Supvrs., General Public	Ferver/Coenen	ETN	yes	yes
	8:00pm 10:00pm	Science Fiction: Keeping Up With Change #99	Teachers, Writers, Librns., General Public	G. Hartung	ETN	yes	yes
TUESDAY April 13	8:30am 8:55am	CP Daily Information	CP Staff	Woeste/Hegge	ETN/ SCA	no	no
	9:00am 9:50am	Badger Home/Garden /Family Living Forum	Co. Home Economists	L. Meiller	ETN	no	no
	10:00am 11:50am	Indian Library Service	Public Librns. and Indian Librarian Trainees	M. Fuller	ETN/ SCA	yes	yes

(1) Indicates systems on which transmission will be made.
(2) Indicates if preregistration is required.
(3) Indicates if fee is required.

EXHIBIT 9

UNIVERSITY OF WISCONSIN–EXTENSION
RADIO HALL MADISON, WISCONSIN 53706 AREA CODE 608 262-4342
INSTRUCTIONAL COMMUNICATIONS SYSTEMS

TO: ETN Students

FROM: Lorne A. Parker, Director, Instructional Communications Systems

RE: LOCATION & OPERATION OF ETN EQUIPMENT

Welcome as a student enrolled in one of the many programs transmitted via the Educational Telephone Network (ETN). According to the enclosed registration receipt, you have selected an ETN location indicated on the registration material.

Educational Telephone Network

ETN is a private telephone network used for the transmission of educational programs throughout Wisconsin. It takes the form of a huge party line with stations located at courthouses, UW campuses, libraries, and hospitals in approximately 100 Wisconsin communities. Each station has identical equipment: a speaker and four microphones. This two-way equipment enables a person at any ETN station to hear anything transmitted on the network as well as to participate in discussion with all other points on the network. (See reverse side for "How to Work Station Equipment.")

Helpful Hints for ETN Students

1. If you have any questions regarding your class, or would like to know specific room locations of the ETN facilities, call your local University Extension County office.
2. Arrive 15 minutes before the first scheduled class begins.
3. Make sure the ETN equipment is operating. Many times there will be a program prior to yours but if not, music will be transmitted so that you can adjust the volume and transmission quality.
4. To ask a question or make a comment, depress the bar on the base of the micr
microphо .

Any comments

8/74

UW-E

A PROGRAM OF UNIVERSITY OF WISCONSIN - EXTENSION

PHOTOGRAPHIC MASTER CLASSES
TUESDAYS, 8:00 - 9:50 P.M.
SEPT. 16, 30, OCT. 14, 28,
NOV. 11, 25, DEC. 9, 1975

LOCAL CONTACT: MILLIE SEAMAN 262-4342
ETN LOCATION: MADISON, OLD RADIO HALL

SOCIAL SECURITY NO.
345-30-1354

JOHNES, JONES
303 E. Gorham
Madison, WI 53706

HOME PHONE:

BUS PHONE:

FORM UW(22) 344

REGISTRATION OFFICE
FEE $ 30.00
TOTAL
PREPAID
BALANCE
CASH OR CHECK NO.
CLERK

EXHIBIT 10 (right)

EXHIBIT 11 (above)

- TAPE DUPLICATION: Cassette and reel copies of programs available for purchase by faculty and students.

The ICS facilities are available by appointment and are under the supervision of an ICS technician.

Program Format

Instructors are contacted one week to two days prior to a program to determine the format necessary for the production worksheet which is submitted to the network engineer for use at transmission time. Followups are made with the instructor during the program series to acquire the precise format for each program.

Evaluation

This is the final component of the program planning process. An evaluation system called the Program Evaluation Checklist (PEC) was developed in order to determine if appropriate education techniques were designed into network programs. Through this evaluation system, the relationship between the communications system and the educational objectives of the program can be studied. The use of an evaluation system is a cooperative effort between the department programmer and ICS, with all evaluation instruments and materials supplied by ICS. Their efforts lead to a tailor-made evaluation checklist which is mailed in advance of the last session to the LPA with complete instructions on how to administer it.

Data from the evaluation is interpreted with faculty in terms of program strengths and weaknesses, and serves as an aid for improving future programs. Although not all programs are evaluated, informative evaluation is going on all the time about the worth of the programs, whether they are programs in the general or public service category. ICS does receive some form of feedback from the instructor and students on most of the programs.

Local Program Administrator (LPA)

The various functions of the Local Program Administrator have been mentioned in preceding sections, however, the role of the LPA and the effect of his efforts in the county need to be fully understood. The LPA is usually the chairman of the County Extension Office who has been designated by the District Director to assume the responsibility for coordinating network programs in each county. He is responsible not only for the scheduling arrangements through the Program Announcement procedure, but has the overall responsibility for the administration and promotion of programs on the county level. These responsibilities include:

1. Equipment security and trouble-free operation
2. Establishment of a program information base
3. Localizing press releases
4. Actively informing clientele groups of specific programs
5. Direct mail efforts
6. Handling walk-in registrations
7. Handling room assignments
8. Keeping track of enrollments
9. Distribution of program materials: printed handouts, slides, evaluations, attendance sheets
10. Identifying, hiring, and training Aides to assist with the administration and promotion of programs

Aide Program

A committee of Community Programs faculty was appointed in 1969 to assure a more effective operation of ETN in reaching people with Extension programs. The committee recommended that "para-professional" people be hired to assist in staging ETN programs at the County Extension offices. In line with this recommendation, a pilot program was initiated in 1970 with one location in each of the eight districts. There were immediate, measurable, beneficial effects in all of the eight pilot locations, such as:

1. Increased attention given to the promotion and publicity of ETN programs, resulting in more activity and offerings of ETN programs.
2. More personalized service to clientele, making the system available to small groups and/or individuals, resulting in "satisfied customers."
3. Freeing the county-based Extension faculty's time by eliminating many of the "chore jobs" from their work load.

Since then, funds have been allocated to the District Directors for the hiring of Aides statewide on a yearly basis. Today more than 50% of the counties have Aides who assist the LPA's in performing various duties involved in the administration, coordination and promotion of programs.

To provide added support, ICS conducts in-service training programs on the network for Local Program Administrators and Aides at the beginning of each academic year. Specific questions from the locations can be answered and ideas shared concerning any related subject. Last year an independent learning package was put together providing cassette tapes and printed materials which cover all aspects of the network operations and procedures. The learning package serves as a ready reference for the Aides in their daily involvement with the programs, and reation to it has been positive.

Conclusion

After a life span of ten years, ETN is no longer a new media to Extension faculty. The program requests for network time are proof of that. ETN is now a viable statewide communication system linking all county offices, most UW System campuses, over 50 hospitals, plus various libraries and high schools. ETN is being used routinely not only for weekly staff conferences and continuing medical education seminars, but for a cross section of programs reaching thousands of people. Moving programs from the initial planning phase to their ultimate transmission involves considerable support activity, coordination and cooperation. Through the collaborative efforts of Extension

faculty, various techniques have evolved to help systemize the total network operation. And it is through Extension faculty and its strong organizational structure that the network has become the successful operation it is today.

DESIGNING TELECONFERENCE PROGRAMS: SOME CLUES FROM THE WISCONSIN EXPERIENCE

Marcia Baird
Assistant Director
Instructional Communications Systems
University of Wisconsin-Extension

Reprinted from The Status of the Telephone in Education, University of Wisconsin-Extension, May, 1976.

Wisconsin's Educational Telephone Network (ETN) and the Statewide Extension Education Network (SEEN) are new mediums in an historical perspective.

Although these teleconferencing systems are a means to an end in Wisconsin--delivery systems for the entire state--access to them isn't enough. Users need to know how to design programs specifically for these media, media that are similar to and different from other educational systems.

In contrast to the scores of experiments comparing the effectiveness of telelectures versus traditional face to face classroom learning, few studies have focused on the design of teleconferencing system programs.

Fortunately, there is a considerable amount of research on adult learning in face to face situations and via other media that's at our fingertips. In Wisconsin we can also glean valuable insight into teleconferencing program design from a decade of programming experiences.

By paying attention to adult education literature and actual programming experiences, we can make an intelligent attempt at designing teleconferencing system programs no matter what our specific educational objectives.

It will be my attempt in this paper to illustrate how Wisconsin's faculty, using the ETN and SEEN systems, have operationalized implications of adult learning research into statewide classroom practice. Initially the focus will be on general guidelines or "ideas to think with" that seem paramount to teleconferencing program design. Then the focus will shift toward how programmers operationalize those "ideas" into specific techniques for program organizers, formats, discussion and feedback.

"Ideas To Think With" About Teleconferencing Program Design

From adult learning research, a decade of ETN and SEEN programming experiences in Wisconsin and many informal conversations with faculty, there are some general guidelines that need to be considered in teleconferencing program design.

Short Learning Segments or "Much Rather Than Many"

A rule of thumb used by many educators is to present no more than three major ideas in each half hour program segment. According to G. W. Hartmann[1], much rather than many should be the pedagogues' curricular watchword.

In a discussion of general principles for patterning learning, J. K. Brilhart[2] states that greater learning and more satisfaction were found in groups where the average number of distinguishable topics per two hour discussion was less than eleven than in groups where the average was more than fourteen.

As the amount of material increases, short term retention decreases. H. J. Klausmeier[3] suggests that this may happen because a large amount of material is difficult to rehearse effectively, or because presenting a greater amount of material increases the chances for interference between items held in short-term memory. He states that one clear implication for instruction is that large amounts of information should not be presented in a short period of time if the intention is to have it learned and recalled.

Because of the "much rather than many" principle, tied to the fact that adults don't listen intently for very long, many of Wisconsin's teleconferencing programmers present a limited number of well developed ideas into their programs and try to change the pace of those programs about every 10 minutes, even if it involves using the question and answer technique to break up pure listening.

Active Student Participation

Teleconferencing systems programs should involve participants in more than listening. One of the principles of the stimulus-response theory, according to E. R. Hilgard[4], is that the learner should be active rather than a passive listener or viewer. Learning by doing is still an acceptable slogan. "Doing" or participating on ETN can take many forms. More often than not it's mental work like asking or answering a question, discussing a problem or brainstorming. But it can be periods of physical activity. During a program on Creative Design With Wood, one ETN instructor actually had his participants using hammers and blocks of wood at each site to gain some hands-on experience with the technique being discussed. Whatever the form, spoken or written, overt or covert, active student participation is an important process between students and instructors.

Repetition

On a largely audio medium, teleconferencing instructors have found that students do listen to them intently for short periods of time. If there is interference of any kind, such as a chair shuffle at a site or noise from the hallway, instructors have found that students may become confused if frequent repetition is not built into the program.

In discussing listenability and its relation to readability, G. R. Klare[5] states that spoken material has the tendency to drop from memory rapidly without the possibility, as in written material, for the reader to go back to an earlier word, phrase or section.

Repetition is often the answer during teleconferencing programs. The amount of repetition required will probably increase as the number of ideas and discrimination among those ideas increase.

To overcome the effects of forgetting and interference, various forms of organizers have been used by Wisconsin faculty, including study questions, verbal interim summaries and session summaries and assignments.

Feedback

Assessment is important both for the teleconferencing student and instructor. There are many assessment exercises that can give the student feedback about his achievement.

In addition to easing communication difficulties, R. V. Harnack[6] states that rephrasing is one of the best sources of feedback. He suggests that every group have a rule that no one be allowed to disagree with another's argument until he rephrases that argument to the satisfaction of the originator. Other assessment exercises can be verbal responses to study questions, short assignments and other simple activities besides formal testing.

The instructor, too, needs feedback about course content, presentation, delivery and whether it's meeting the needs of students. Wisconsin's programmers have developed a variety of techniques for feedback for both instructor and student.

Program Design Techniques

Wisconsin teleconferencing users have developed a repertoire of techniques to operationalize the guidelines about "much rather than many," student participation, repetition and feedback. Four major program design elements have been selected and will be presented here with examples of how they have been put to use in Wisconsin.

Program Organizers

One thing about which adult education research leaves little doubt is that learning increases when the organization of a program is made very clear. Teleconferencing programmers in Wisconsin have developed a number of steering wheels or organizers to prepare and direct students who are scattered all across the state, sometimes with only one or two at a location.

David Ausubel[7] states that a key variable involved in meaningful learning is how the material is organized. In order to present material in a meaningful form, he suggests that the instructor use various forms of organizers. B. B. Proger and R. G. Taylor[8] cite three types of conceptual aids: advanced organizers, concurrent organizers and post organizers.

Advanced organizers used in conjunction with teleconferencing programs have included a welcome letter to students before the class officially starts, information in the course brochure about suggested readings before the course begins, article reprints with key points underlined, a syllabus outlining activities learners might want to participate in prior to the course or such verbal clues as "Today we'll be presenting three roots of sex stereotyping in the schools."

Concurrent organizers can be identified as statements like, "Let me cite one example and statistic to support that view," typographical cueing on the session's topographical outline or slides which are used in conjunction with the teleconference presentation.

Post organizers might include a verbal summary of conclusions or a restatement of the problem discussed in terms of the issues resolved and remaining, or perhaps a sheet of 12 to 15 study questions that students should be able to answer after the discussion or from reading material.

Here is how Wisconsin's teleconferencing instructors use various organizers:

Welcome Letter

Once students have registered, and before the first meeting, some instructors prepare students for the teleconferencing learning experience by sending them a welcome letter. The letter might include a brief explanation about the system, program and course objectives, a first assignment and course written materials so that the student can immediately see the scope of the course.

Biographical Sketches and Picture

Students are often interested in getting to know their instructors and any guest speakers as people. Such a steering wheel for students might be some biographical information about the instructor and any guests and a picture or two. Some teleconferencing coordinators and instructors have included their picture and brief autobiography in the course brochure or distributed it along with the handout material after registration or for the first program.

Key Student Information and Roster

It's a challenge to get acquainted with a statewide teleconference class. One way to orient the instructor and the students to the makeup of the geographically dispersed group is to secure some pertinent information from them. Some questions on present position and occupational and educational experience might be asked on the course brochure registration blank. Another method is to use a 5 x 8 index card that are sent to students to complete during the first session of the program. This card may ask them further details about professional experience, educational background and reason for taking the course. In addition to providing valuable background information for developing course direction and discussion, the information can be condensed and used on a class roster to be distributed to all students. This biographical data, backdropped by students identifying themselves and their location before speaking, also helps personalize the teleconferencing system.

Written References and Guides

Topographical Outlines. Topographical outlines for the program sessions help structure subject matter for students and focus attention on certain points. Outlines spread out over two or three pages also have been helpful to students as working note sheets.

Points on the outline can also be enumerated for easy reference. One education instructor, for example, developed a pattern for each ETN session with a topic and topic outline. In ETN session 3, the topic

outline was numbered with a major heading of 3.1--Growing Interest in Vocational Education. Then the outline was subdivided with points 3.11, 3.12, 3.13 and 3.14. The instructor always tried to refer specifically to a subpoint during the ETN program. If he was talking about 3.21, that was the Northwest Ordinance. This way students could follow easily.

Abstracts. Instructors have also supplemented program sessions with an abstract of a page or two of additional readings. This device is particularly geared for students in the state who don't have ready access to a library and/or some of the subject matter journals.

Activity Syllabus. In addition to outlining content, a syllabus may also outline activities that learners might participate in before and after the particular program.

Bibliographies. Instructor's bibliographies and bibliographies of library materials, free publications or resources people might use in their own self-directed activity following the program could all be included.

It should be noted here that one of the important things for students, especially in statewide teleconferencing programs, is that they have access to reference material. To minimize this possible frustration for students in remote locations of the state, ETN courses have developed strong working relationships with the University of Wisconsin Extension Library service. Libraries of reference materials have been set up in some state locations and also students have been encouraged to mail-in their requests to the library for additional references.

Study Questions. The instructor could also compose 12 or 15 study questions per session that students could answer either from anticipated discussion or from reading material. Often this list of questions could serve as a summary device to a program or as a basis for class discussion. Identifying any questions on the list which students were unable to answer gives them additional guidance--a kind of post organizing device so that they can sense what kinds of questions they should be able to answer.

Verbal Cues. In addition to various forms of printed cues, participants in teleconferencing programs can be prepared and guided with such verbal cues as, "We will now discuss four roots of sex stereotyping in the schools."

Harnack[9] states that announcing the organizational pattern is a valuable use of road sign messages during discussion. By setting the boundaries of his own message, the instructor alerts others to what is coming and to how they can expect it to arrive.

In verbal cueing, B. Rosenshine[10] indicates that a pattern which presents a structuring first, follows it with details and concludes with a structuring statement, is more effective than either an inductive or deductive pattern of explanation.

Program Formats

ETN and SEEN programmers have developed and now use a variety of program formats. The classification of these presentation forms into separate categories as presented here is to a certain extent artificial because often they overlap. However they are simply presented here to illustrate that no one technique, or combination of techniques, is more effective than others for teaching adults via ETN. The formats each instructor uses emerge from such influences as the subject matter being discussed, instructional objectives and audience. Formats may move from lecture to buzz groups, slide from panel discussion to brainstorming or from lecture to role playing. Periods of group activity are important parts of many Wisconsin programs.

In addition to giving students an opportunity for active participation, D. C. Barnlund[11] states that group problem solving activities have the advantage of suggesting more hypotheses and bringing more knowledge to bear upon the solution of the problem than any one individual. The combined critical thinking of everyone in the group is much more likely to catch and correct deficiencies in evidence and reasoning than an individual might, and group interaction seems to have a stimulating effect upon the performance of individuals. R. M. Gagne[12] states, however, that the inclusion of the discussion group technique is a decision which emphasizes knowledge transfer, cautioning that initial knowledge is a prerequisite to a discussion class, not a part of it.

Although particular groups such as clergy may enjoy rapping with one another, it has been found that some groups won't "buzz" on the network. People may ask questions in these situations on the network, but they won't make statements, possibly because the voice on the network may be seen as an authority figure.

For this reason and to simply include student participation in their programs, extensive use has been made of group work at the individual locations. This may range from role-playing to discussion of case studies to developing a group presentation.

To facilitate local group discussion and activities, teleconferencing program coordinators often designate one person or a team of leaders at each site to act as group leaders. N. R. Maier and A. R. Solem[13] found that leaders significantly improved the quality of group decisions by giving the minority a greater voice than was possible under leaderless conditions.

Lecture

The lecture is a popular teleconferencing format among doctors, nurses and attorneys. They're used to learning in this way and it's efficient. Large numbers of facts, new information or review material can be presented in a short period of time. On the Wisconsin system, however, it's not just a lecture. The teleconference lecture is reinforced in many ways by supplementing the verbal material with written organizers. Prior to the program, students may receive skeleton outlines so that they can easily follow the lecture and take notes right on the outline. Significant visual materials may be incorporated into handouts. A study question list, bibliographies, additional reading sources and perhaps an instructor's picture and bibliography may also be in the packet supplementing the session. Sufficient question and answer time is allowed for two way communication so that students around the state can clarify speaker ideas, support or dispute material and use their own experiences to carry discussion into personally relevant areas.

Celebrity or National Expertise

Well known national and international authorities are frequent guests on Wisconsin's teleconferencing systems. Guests of this caliber not only attract students to the program, but are rich teaching and learning resources and interest-holders. Guests are easily and inexpensively connected to the ETN network via long distance telephone, usually from their homes or offices. Main presentations may be given during the actual program or prerecorded. If prerecorded, resources are then connected live for discussion. Guest speakers should be informed on any special directions they should take during the program and sometimes there is a biography exchange. In addition to the class receiving a biography of the resource person, it might be helpful, too, to conversely send a class roster with some background information as it's related to the field under study, to the resource person. It may also be helpful for guests to listen to tapes of past programs in the series in order to analyze what has already happened and been discussed.

Student Reports

Individual or group student reports are frequently used in education and communication programs. Example teaching no matter what the subject area, helps bring the program down to earth and stimulates interest. The sharing of experiences also personalizes the teleconference learning experience.

Interviews

Interviews of 10 to 15 minutes can bring out key ideas in many programs and uncover information not generally available. Interviews may be between two people at the same teleconference site, between different sites or perhaps prerecorded. An education instructor frequently asks his students what resource people they would like to hear and question during a teleconference session. During the program the instructor interviews the guest with about 5 to 8 questions that students have sent in. Following that segment, the network is opened up so that students can carry the discussion into other areas. Prior to the interview, students may be encouraged to do supplementary readings to broaden their base of discussion and add to their understanding of the session topic.

Panel Discussion

Panel discussions can be used effectively to identify problems to be considered, to explore an issue, to give participants an understanding of the component parts of a problem, to weigh advantages and disadvantages of a course of action and to create audience interest in the issue.[14]

Panelists may be located anywhere in the state or country. The variety of voices composing a panel also helps hold listener attention. Panels should not include more than four different people, however, because statewide participants need to be able to distinguish voices. And, as with any panel discussion, a moderator helps keep the topic in focus.

Again, bibliographies and other appropriate support materials for the panel discussion should be sent to students prior to the program.

Reactor Panels

Reactor panels can improve program communication, particularly clarification of important points and ideas. Panelists represent the entire audience by reacting to a speaker's presentation. To be successful, the speaker panel members and the moderator should agree on program objectives and procedures before the actual teleconference. Because of large enrollments and limited program discussion time, reactor panels can also efficiently cover common audience questions. Once these questions are covered, the network can be opened up for other questions by statewide participants.

Role Playing

Role Playing serves as an excellent way to get into the other man's shoes and makes discussion more realistic. An ETN program for social workers and foster parents in Wisconsin frequently uses short vignettes to convey foster parent feelings. Skits can be prerecorded prior to the program or can be improvised to fit in with an individual's conception of his or her assigned roles. Structured role playing, where the script and performance are carefully planned out prior to the presentation, work well on teleconferences. A suitable introduction and problem solving discussion following the skit are also needed to meet intended objectives.

Group Activities

Buzz Groups. Wisconsin teleconferencing participants frequently split into small subgroups at their sites during a program for brief discussions. Water supply operators use approximately 20 to 30 minutes of their two hour programs for local discussion. The buzz group is often used following a lecture or panel discussion. The instructor usually indicates what particular topic the buzz groups should consider and sets a time limit. This format is used as a means of generating questions from the audience while giving everyone in the group a chance to participate in the formation of those questions. Group leaders at each site can serve as resource persons, thus alleviating handling common student questions. A representative from each group usually then reports back to the group through questioning or offering group conclusions.

Case Study. Case studies may be particularly helpful if the objective is to have participants search out information or think through and attempt to formulate possible solutions to problems. Clergy enrolled in a Parish and Personal Conflict: Disaster or Opportunity Series were encouraged to bring with them written case studies of conflict situations they were currently facing or had recently faced. This information then became the agenda for group consideration by each location. Spokesmen for each group reported on how the site analyzed phases and aspects of the study to the statewide class.

Group Project Sessions. An agricultural engineer who works with 4-H woodworking leaders via Wisconsin's ETN system includes some periods of activity in his programs. In a wood identification program, for example, he devoted the first half of the program to laying the basic background information on the topic. The second half of the program involved actual wood identification by participants at each site.

Packets containing a wood identification key and wood samples were sent to each site. The instructor would work with the group by saying, "Okay, pick up piece of wood marked number 1. Now let's look at it and tie it into the key. Does it have that characteristic, does it have this characteristic?" After working down the key for practice, he'd ask the students to take the second sample and trace it down the key and come on the network when the group felt they had identified it.

Brainstorming. Brainstorming is a simple concept for getting the most creative energy out of a group discussion. Network brainstorming sessions have ranged from collecting a large number of ideas about Wisconsin heritage programs to ideas for a weekend conference for forest owners. According to R. V. Harnack and A. F. Osborn[15], the problem to be brainstormed has to be specific, simple and preferably familiar. After the program rules are explained, teleconferencing programmers simply open up the network for ideas. The quantity of ideas is more important here than the quality, and freewheeling is invited. Editing and synthesis are usually accomplished after the teleconferencing session.

Pre and Post Teleconference Discussion Sessions. A method used successfully by several teleconferencing groups is a warmup session prior to the actual program. Groups at each site may be asked to meet an hour before the teleconference time to work on small group projects, case studies or discuss readings in face to face groups. Some instructors have found that when it's time to begin the program, students are eager to share their ideas, thoughts and comments with the instructors and other students over the network. On site discussion is also frequently scheduled for the hour following the teleconference session.

Program Discussion

Active student participation stands out as a clear guideline in educational research. In many forms, with many different kinds of subject matter, participation has almost invariably been found to contribute to learning.

To elicit statewide discussion and discussion among participants at individual sites, teleconference instructors have incorporated several discussion tools into their programs.

The question is the chief verbal tool for shaping and modeling interaction in the "classroom," according to B. B. Hudgins.[16] As a guide for questioning, N. M. Sanders[17] suggests that instructors aim at devoting at least one third of the class time to questioning above levels of memory.

Stimulating discussion among 150 students scattered across 43 locations, for example, is a challenge for teleconference instructors. Some general guidelines faculty use to secure involvement include creating a climate in which everyone feels psychologically a part of the statewide group, being hypersensitive to attempts to enter discussion and areas of potential confusion, and calling on individuals who have work experience relating to the discussion.

During teleconferencing sessions, instructors may often be greeted by periods of seemingly awkward silences. Pauses, without being able to read visible reactions, may cause panic. It should be understood, however, that pauses may be necessary for students to think through a question.

Although active student participation through discussion is generally seen as a positive feature, it does have some limitations. In addition to it taking time, discussion spreads out responsibility so that students can frequently come to a group with little preparation and let others carry the ball.[18] When an instructor can't look his students in the eye for a response as is the case in a teleconference, it may be especially easy for students to sit back and avoid entering into the discussion. To alleviate this, Wisconsin faculty use several delegation techniques which will be discussed here.

And finally, the interaction potential among teleconference participants will be reduced as the class size increases. For this reason many programmers incorporate group activities into their sessions so that students at each site will have an opportunity for dialogue with others.

Linking Up With Student Background

Questions can be devised more easily if the instructor knows something about the students' backgrounds. One of the best ways of getting teleconference participants into the discussion is to ask them to contribute information in an area in which they have specific knowledge or background. Keys to linking up with the situation and experience of students can be obtained through the course brochure registration blank or from special index cards filled in by students.

The instructor having the names of students in front of him, along with some of their work experience, for example, can help draw them into discussion. If the instructor is talking about apprenticeship, for example, and he knows from his list that there are five people in the statewide class who either work with an apprentice or are associated with an apprenticeable occupation, then he can direct some questions specifically to those people. In addition to gaining participation, this technique also helps personalize the teleconference experience for learners.

Plant Questions

Planting questions among several statewide enrollees is another technique used to encourage two way dialogue. Instructors can prime several students before the session to have some questions ready if discussion is slow to start or lags. Moderators also usually ask questions themselves, particularly trying to anticipate the questions of the person in the state who hesitates to enter into discussion.

Assign Feedback

Assignment reporting during roll call or other parts of the teleconference program is another participation tool. Short student reports of about 3 or 4 minutes can easily be incorporated into teleconference programs. Course handouts can also be used to generate assigned feedback. Instead of pinpointing individuals to respond to an assignment, the instructor could simply say, "I'd like to have the people at Green Bay be ready to respond to the following questions during the next teleconference session." When the class has ended, he knows those students are going to work together.

Feedback

Feedback for both the statewide audience and the instructor are important elements needed in teleconference programs. Faculty have developed a variety of methods, both formal and informal, that build on the immediate kinds of feedback received by both students and instructor during the program.

Visit Sites

By originating teleconferencing programs from a number of different statewide locations, an instructor can give his students important feedback about their progress as well as gain insight into how the course is being received by students. Instructors may visit students in their work location prior to a program and then meet with the local class an hour before and an hour following the program. Students at satellite locations are encouraged to travel to that particular location for that session.

Face to Face Group Conferences

A group conference with all the students in the northern part of the state, for example, or a conference held in conjunction with another event such as the Wisconsin Teachers Education Conference can also provide valuable feedback and personalization for instructors and students that may not be possible during actual teleconference program time.

ETN-O-GRAM

This device for feedback from students was a regular invitation to one ETN class to send in written comments about the class, or to ask questions not brought out in statewide discussion. Other instructors continually urge their students to write or call them if they have comments or questions about the course between teleconference sessions.

Instructors Listen to Students and Themselves

Listening is a requirement for the group leader. If the instructor is to discover student goals, he must listen to them during the teleconference session and in every other opportunity he has. The very art of listening convincingly demonstrates to the student that someone cares about him and his problems. Everyone needs sympathetic audiences, and when we find someone who cares enough to listen, we can scarcely escape involvement in the group he represents.

For the instructor, listening to himself on tape may also give insight into how he listens to others. Tapes of teleconference programs in Wisconsin are available for each session and many instructors make it a practice to listen to their last class session before preparing for the next.

Student Evaluations

Throughout the course some instructors have asked members at a site to collectively fill out a weekly evaluation sheet in order to give them immediate feedback on whether or not they were on base with the topic.

Periodically, other instructors have asked students to respond in written form to the open-ended statement, "My general reaction to this class and the technique by which it is being taught..."

Another kind of student evaluation system used by some teleconferencing programs is the Program Evaluation Checklist. The purpose of this instrument is to study the relationship between the telephone system of communication and a program's educational objectives.

The PEC was developed by communication educational specialists and content specialists based on variables common to the concerns and interests of both. Specifically the PEC consists of a list of statements which define aspects of program content, organization, materials, lecturer, physical facilities and technical quality.

All students in selected programs are asked to complete the questionnaire by rating each statement on how well it describes the program. The scale is numerical, ranging from 0 to 9. Demographic questions are also included in the evaluations to obtain profiles of Wisconsin teleconference students.

At the completion of the evaluation processing, a report is filled out and reviewed with individual instructors. Evaluation materials are confidential between the ICS staff and the instructor.

Group Leader Assessment

Another form of feedback that has been used on the Wisconsin teleconference system is group leader assessment of the program several months after its completion. Using the PEC results and other informal feedback devices, the instructor and the group leaders from each site meet together on the network to interpret evaluation data, share comments and recommend guidelines for future programming.

* * * * *

The techniques presented here for teleconference program organizers, formats, participation and feedback are only a skeletal structure of those that Wisconsin faculty have put into practice.

ETN and SEEN are new mediums of instruction and consequently little research has been done on effective program design specific to them. In order to make an intelligent effort at designing programs for these media, we must continually look at what tools are being used currently, and pick and choose among those that seem most effective for our particular purposes. Coupled with that, we must also be consumers of research in adult education in general and of adult learning research via other media in order to transfer some of that information to teleconference program design.

Clearly there are more techniques presented here and more known about adult learning that can be applied to teleconference programs than most faculty use. Programmers, however, need to continually think with and about teleconference techniques as they design programs focusing on specific instructional goals and audiences.

Footnotes

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ETN: A TECHNICAL SYSTEM

Daryl Braun
Vice President and Director of Engineering
Darome, Inc., Harvard, Illinois

Dennis Gilbertson
Technical Director
Instructional Communications Systems
University of Wisconsin-Extension

Henry C. Hansen
Engineer, Transmission Systems
Wisconsin Telephone Company

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ETN, Wisconsin's Educational Telephone Network, is a communication system designed to carry university extension programs throughout the state, and to do so with as little interference as possible with the on-going teaching and learning process.

ETN means a number of things to different people who use it. For the student in a remote area of Wisconsin, it is a means of access to college level and continuing education courses not otherwise available in the local community. To extension faculty members, it is a way not to travel. The instructor can deliver courses from his home campus to students throughout the state, eliminating the need to visit each community.

ETN is also a technical system. And to the engineers and technicians who designed and developed it, it is a network of telephone facilities, station equipment, and studio and control rooms that provide instantaneous voice contact between the student and the instructor. The specially designed station equipment is installed at approximately 200 locations throughout the state and interconnected by a network of telephone facilities. This interconnection uses approximately 5000 miles of voice channels and the service of 20 telephone companies to provide statewide coverage. Home base for the system is the Instructional Communications Systems studios and control rooms located in Old Radio Hall on the University of Wisconsin campus in Madison.

The development of ETN took ten years from its inception to reach its present state. Throughout the design and development of ETN, an important concept was applied to every facet of the system: The hardware must be as inconspicuous as possible, and every attempt should be made to minimize the technology that the students and instructors must cope with. Therefore, every effort was made during the design and construction of ETN to provide for easy operation and reliable trouble-free service.

The intent of this paper is to present a picture of ETN as a technical system. We will describe what exists today, users requirements, general design criteria and some of the problems and solutions encountered during ETN's development and implementation phases. The three major components of the ETN system, which will be examined here consist of the network origination studios and control room, the statewide telephone transmissions systems and the individual station location equipment.

ETN as a technical system hasn't always been as it exists today. Earlier attempts at teleconferencing in 1965 used a system much like a business conference call. A network was established through the telephone company operators using existing conferencing bridges. Station equipment consisted of standard desk top speaker phones. These early attempts were sufficiently successful to point out the need to provide programming on a statewide scale. This demanded a larger network with more stations tied together on a scheduled basis.

Transmission systems engineers for the telephone company pointed out the need for a major change in this approach to teleconferencing. On a large scale, the plain old telephone service (POTS), using operator assisted conference calls, was not a reliable means. Conferences were susceptible to many interruptions and delays in network hookups. The telephone company engineers proposed an alternative to POTS, one that would provide the dependable service required. They suggested a network of dedicated lines assigned exclusively to this service and available 24 hours a day.

The network was installed and new station equipment was provided. The new equipment consisted of a four wire telephone and handset with a 106B type speaker/amplifier. (Picture 1) This station equipment was installed in courthouses, hospitals, libraries and on the UW System campuses throughout the state. Locations were changed and installations added as programming and use dictated.

To use the new ETN equipment, a student would turn on the speaker and set the volume for a comfortable listening level at the start of each program. In order to ask a question or participate in the discussion, the student simply lifted the handset and spoke into it. Picking up the handset disconnected the loud speaker from the network. After having asked the question or made a comment, the student would push down the cradle button on the telephone or hang up the handset to allow everyone else at the listening location to hear the response from the instructor over the loud speaker. This equipment, tied together by the effective dedicated transmission system and controlled by the studio in Madison, served ETN users well and prompted rapid growth during the period between 1966-1968. Along with this growth came an increase in sophistication of the users. Students soon overcame the novelty of the new system, and instructors become more complex in their program planning. Users were no longer content with the mere fact that the system worked, and new demands were made of ETN. Technical shortcomings, previously overlooked because of the newness of the system, were no longer tolerated; they turned into glaring faults.

Analysis of system trouble reports identified a number of problem areas. The network's larger size and the resulting increase in transmission system circuit miles, caused the inherent line noise to rise beyond tolerable limits. Telephone system

engineers were able to control the noise build up by using the best available circuits and reconfiguring the network into smaller, more manageable blocks. Rapid and changing growth patterns made this a continuing effort.

Additions and innovations in studio and control room equipment kept pace with the changing needs of ETN as a program origination facility. The majority of trouble reports received pointed out shortcomings with individual station location equipment.

The 1068 speaker/amplifier was small and unable to provide an even distribution of sound throughout many of the ETN classrooms. As class sizes grew it became difficult for people in large groups to hear the lecture. In order for someone to ask a question over the network, it was necessary for the student to pick up the handset and speak into it. The student would hear the response from the handset ear piece. However, picking up the handset from the cradle cut off the speaker, and in order for the rest of the people in the room to hear the response to the question, the student had to hang up the handset or depress the cradle button. This procedure was awkward and, as a result, made it very difficult for students to participate.

A plug and jack arrangement was developed and installed in various classrooms at ETN locations to provide versatility in room scheduling and arrangements. The handset and speaker were tied to additional equipment mounted at a central location in the building and connected with multipair cable. The multipair jack and plug required proved to be fragile. Resulting broken pins and plugs caused considerable downtime and an unusually high number of service visits by telephone repairmen.

A standardized equipment installation was needed to provide uniform operating instructions, trouble analysis and correction procedures. Though standards were established and detailed instructions sent with each service order, not all ETN station equipment was installed accordingly. One example occurred at a site with a very large classroom. During programs it seemed to take an unusually long time to receive any response from participants at this location. The reason proved to be because the speaker had been installed at one end of the room, and the handset on the wall at the other end. The students clustered around the speaker to hear the lecture, and, when they wished to ask a question, they dashed to the other end to use the handset.

The effort to standardize installations among 20 different telephone companies was an overwhelming one. No amount of instruction seemed to guarantee that each ETN location would be set up the same way. Long delays for new classroom installation were often encountered.

Attempts were made to alleviate some of these problems. Some solutions were only temporary, adopted in order to buy time to develop more permenent ones. A large speaker and amplifier was supplied by the telephone company and installed at locations with large rooms and class sizes. The package was called the "Webster teletalk" and is shown in Picture 2. This helped, but it was clearly not the answer. The need to make it easier to participate over the network still remained. The handset was too restrictive in a spontaneous interactive lecture situation.

About this time, the Bell Telephone Company introduced the 50A telelecture unit. 50A was designed for use on regular 2-wire telephone lines (POTS) and was employed by ICS to connect student groups from around the country to ETN via Direct Distance Dial (DDD). A modification to the 50A adapting it to 4-wire operation seemed like the answer. It provided the three main ingredients--microphones, a speaker, and a voice switch to relieve the user from having to push a button whenever he wished to speak. However, the 50A had some drawbacks. Notably, the speaker was small, which limited the size of the audience, and the set had just two microphones which could only be used one at a time. One microphone was selected to be made live by pushing a button on the set. This restricted its use in a roundtable discussion by slowing down the response from the group using the 50A. This equipment was a definite improvement over the telephone handset, but not the final answer.

Clearly, some major steps had to be made in the development of the technical capabilities of ETN. A Dean's Advisory Committee was formed to set up general operational requirements needed for a teleconferencing system such as ETN to successfully fill its role as a vehicle for Extension outreach programming. The result of this effort was the following general statement of operational capabilities:

ETN as a teleconferencing system should be able to connect student groups at a large number of geographically separated locations on a statewide basis. This system must provide a communication environment that duplicates, as closely as possible, a single-site discussion group. Equipment at each location needs to make it easy for students to participate and should provide even sound distribution for groups as large as 300 people. The system must be manageable, allowing additions and changes to be made as programming and use require. A central control and origination point should be maintained to supervise the network's technical operation and provide a point from which instructors can originate programs. The transmission system needs to be sufficiently noise free and of high enough audio quality to provide clear, intelligible communication between all points on the network. Ability to connect groups to ETN from anywhere in the world via the regular telephone service should be provided. Methods are needed to recognize and quickly clear any technical problems that may interfere with service. Designs and associated equipment should be of the latest technology, reliable and serviceable. All station equipment, station location interfaces and installation procedures should be standardized throughout the system.

With these guide lines established, an ETN project team composed of ICS personnel, Wisconsin Telephone Company system engineers and marketing representatives worked to implement them.

Existing ETN Station Equipment

Just as guidelines were developed for the entire ETN network, requirements for ETN Station Equipment were also outlined. In 1973, ICS personnel in conjunction with the Wisconsin Bell Telephone Company set forth guidelines which described a nonexistent station package. After interviewing several sound equipment manufacturers, Wisconsin Bell contracted Darome to repackage their existing sound system modules into the required station equipment.

In the fall of 1973, Darome, Inc. delivered prototype station equipment to ICS for evaluation on their 25 point SEEN Network during the balance of the 1973-74 university year. Experience led to refinements in operation and packaging which were incorporated into the Darome Model 604 which is the exclusive station equipment used on the SEEN and ETN networks operated by ICS.

Darome witnessed the educational impact of ETN and the need for similar conferencing equipment on POTS. The Darome Model 610 convener was designed to meet that need. ICS uses the Model 610 for interfacing instructors virtually anywhere in the world via the DDD network. These two models, the ETN station equipment, Darome Model 604, and the POTS station equipment, Darome Model 610, will be discussed here.

Darome Model 604

The Darome Model 604 convener is a self-contained, portable conference set and is intended for use on multi-point, private, 4-wire, voice grade telephone circuits. The 4-wire circuits have a transmit pair and receive pair to all locations. The unit consists of a station receive channel and a station transmit channel. The station receive channel, which processes the signal feed from the network that is fed into the classroom, consists of an input filter, preamplifier, 14 watt amplifier, and three speakers. This audio amplification system is sufficient to provide highly intelligible sound in a classroom seating up to 300 students. The incoming, or received, signal is adjusted by a single control which is readily accessible on the side of the unit. Care has been taken in the design of the station receive channel to minimize telephone line noise outside the speech bandwidth.

The station transmit channel, which enables students within the classroom to feed signals to the telephone network, consists of four highly directional desk top microphones, a microphone preamplifier, an electronic switch and a telephone line driver. To facilitate student participation, each microphone is equipped with a press-to-activate switch and twenty foot cords which allow the

MODEL 604 IN CLASSROOM USE

microphones to be placed around the classroom for easy access by students. With the microphone within reach, the student can respond to network programming by simply pressing the switch and speaking. A jack is provided on the basic unit to extend the number of microphones in a single classroom to eight with the addition of a Model 605 mixer. This process can be continued up to 12 or 16 microphones by using additional mixers. Microphone signals are not only fed to the network via the station transmit channel, but are also fed to the receive channel amplifier. Thus, the conference set may function as a public address system for its own room. The public address volume is set at a predetermined level in relation to the station receive signal. Single control operation of the unit minimizes set-up and acoustic feedback problems.

The Model 604 is housed in an attractive woodgrain vinyl cabinet which has clean lines for storage. Adequate space is provided in the cabinet for storing the microphones and their associated cables.

Darome Model 610

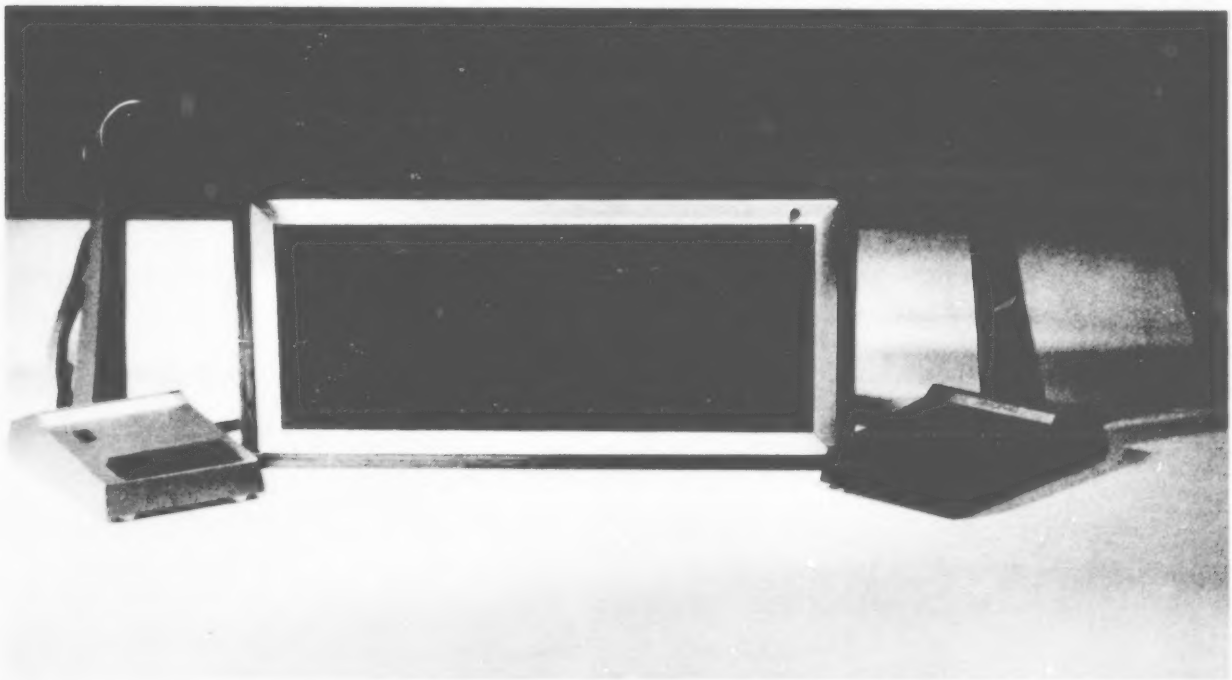
The POTS station equipment, the Darome Model 610, evolved from technical requirements substantially different than those governing the ETN station equipment. Portability was a primary consideration. ICS ships the unit, via common carrier, to an off-campus location for origination of an ETN program. At times, the equipment is hand carried on commercial aircraft. The Model 680 carrying case, which can fit under a commercial aircraft coach seat, houses the Model 610 convener, its basic 491 microphone and up to three additional Model 461 microphones.

Fundamentally, the 610 converts to a common 2-wire telephone circuit, rather than a 4-wire private circuit. Internally, the station receive channel and station transmit channel are very similar to their 4-wire counterparts. That is, the receive channel has a filter, preamplifier and 14 watt audio amplifier. Level adjustment is made by a single control. Transmission to ETN is with the same high quality press-to-activate cardioid microphone used with the Model 604. The difference lies in the switching. A voice operated switching circuit determines whether the station transmit or receive channel is connected to the phone line. In the quiescent mode both are off, and the channel on status is decided on a first come first serve basis.

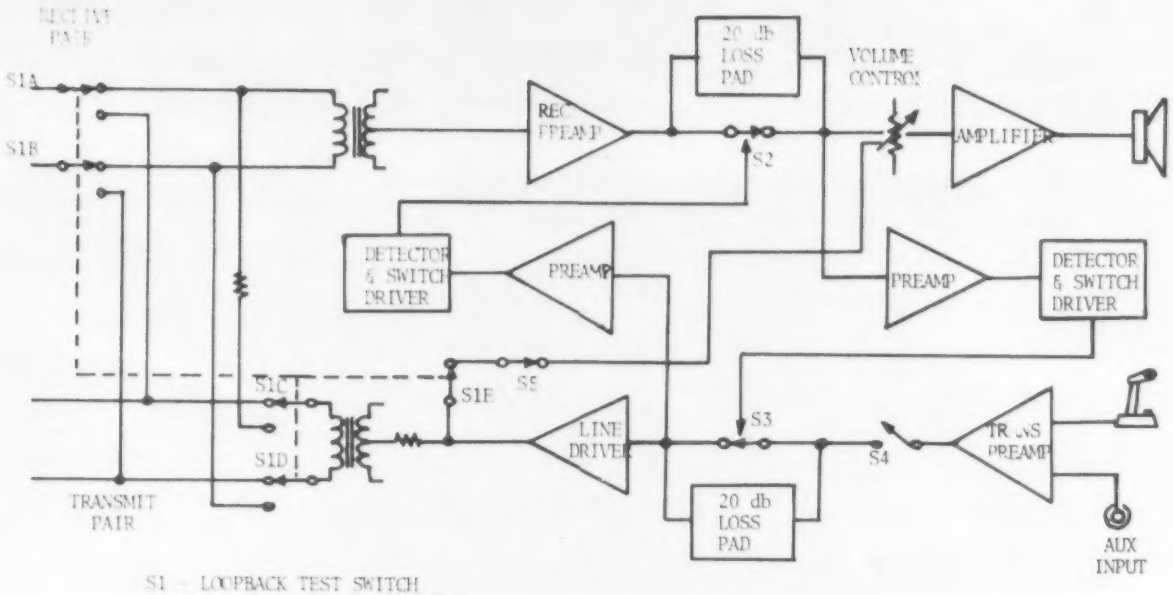
The Model 610 is operated in conjunction with a standard telephone, which is used to dial outgoing calls and provide a ringer for incoming calls. Transfer to the convener is made by a switch on the Model 491 microphone. A Light Emitting Diode (LED) provides an "on line" status indication. A short for the telephone line control leads is provided for telephone facilities with the hold circuit requirements. As with the Model 604, the addition of a Model 603 mixer allows the use of more microphones.

Design Constraints

In designing the ETN station equipment several noise constraints had to be considered; these can be broken into two categories, acoustic and electrical



MODEL 610



S1 - LOOPBACK TEST SWITCH
S2,3,4 - SOLID STATE SWITCHES

FUNCTIONAL BLOCK DIAGRAM MODEL 604 CONVENER

noise. Acoustic problems are related to the classroom size, the number of students in the classroom, the acoustical characteristics of the room, and the number of classrooms that are going to be tied together on the common network.

The classrooms used on the Educational Telephone Network vary in size from rooms seating 20 students to those seating 300, and sufficient acoustic power must be available to provide an intelligible sound level to any of these classrooms. A 14 watt RMS amplifier was deemed adequate, while three 5 1/2 inch speakers provide the sound projection. Additional speaker jacks on the basic unit facilitate adding column speakers to insure proper sound coverage in acoustically difficult rooms.

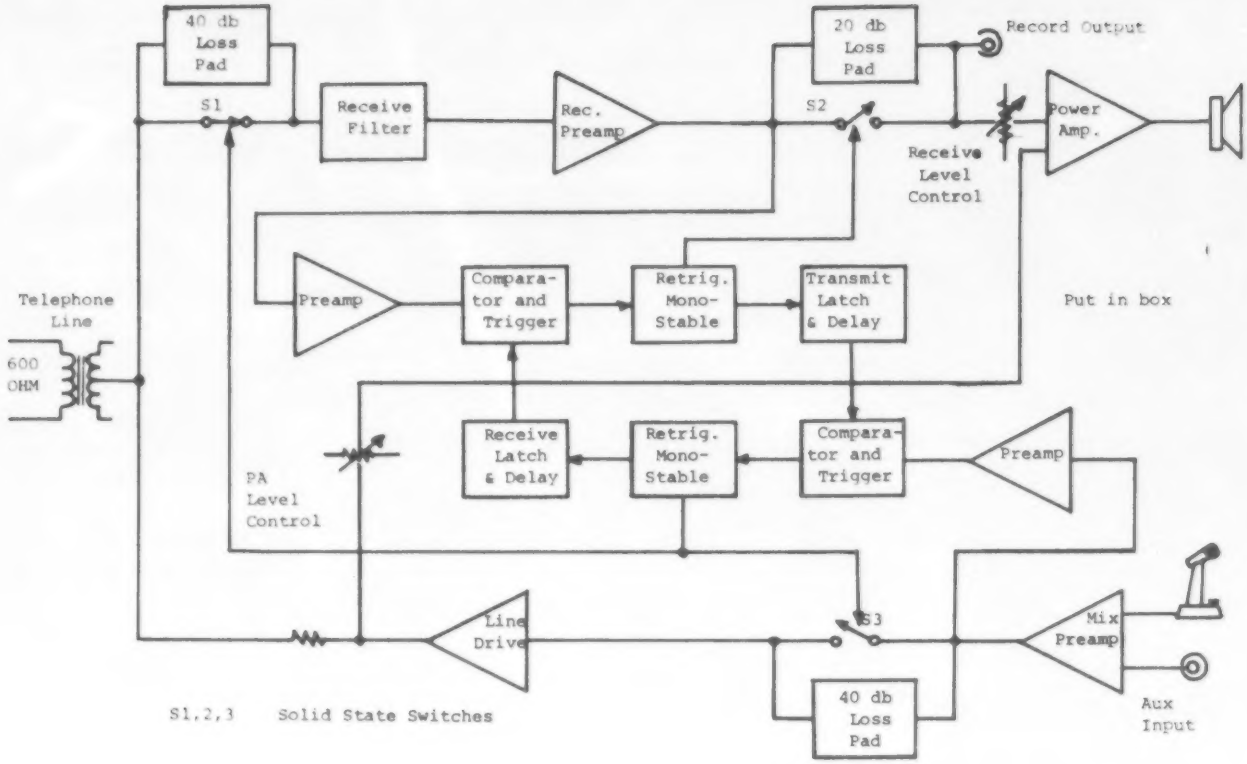
Classroom noise from numerous locations combining simultaneously on ETN would render the network useless for viable communications, therefore unused microphones in the classrooms are kept off to eliminate normal room noises. A voice-activated microphone was not chosen for this application simply because the noise to be eliminated would turn on the voice gate and pass the unwanted noise to the network. The microphone used with the Model 604 is a desk top mic with a built-in press-to-activate switch which requires minimum effort on the part of the student to initiate a question or response. (It was generally agreed that this would not significantly inhibit student response.)

The primary electrical noise constraint is the inherent noise generated by electronic devices, commonly referred to as "white noise." Again, with 200 such conference units tied on a common additive circuit, the amount of white noise would prohibit any intelligible communication. Since the student is required to press the drawbar on a microphone to speak, a solid state switch was added to shut-off the transmit circuit. This electronic switch, S4, was installed in such a way that the transmit circuit retains a proper termination of the phone line while prohibiting any electronic white noise from being transmitted to the telephone network. When the student presses the switch to speak, he activates both the microphone and the transmit circuit.

The noise constraints on the POTS station equipment are similar to those of the ETN model. Because of the generally smaller room sizes as well as the convener's smaller physical size, the Model 610 has one speaker rather than three. Acoustic output power is adequate for medium-sized meeting rooms.

For 2-wire, the voice activation, which was viewed as a disadvantage on the Model 604, is necessary to perform the transmit/receive switching on the Model 610. However, each microphone is disconnected from the transmit preamplifier until the drawbar is pressed. Once the microphone is connected, the voice switch (S3) operates when the input signal is of sufficient amplitude. Having the transmit in a normal off mode, again prevents the electronic white noise from adding to the network noise level.

The second category of restraints governing the design of the convener encompasses those affecting the signal-to-noise ratio. This ratio reflects the amount of signal present to the amount of noise present on the network at a given point and time. Conversely, with a given amount of noise on the network, a certain signal level must be maintained above that noise level to establish effective communications.



FUNCTIONAL BLOCK DIAGRAM - MODEL 610 CONVENER

Technical constraints to achieve a good signal-to-noise ratio involve all the elements in a sound reinforcement system, their location and relative locations within the room and the room acoustics. The room acoustics have to be accepted for two reasons. In many cases the classroom facilities are not under the control the University, such as those in hospitals, court houses and municipal libraries. The second reason is financial. The cost of acoustic treatment for 200 classrooms would be prohibitive.

The elements of the sound system include the microphone, amplifier and speaker. These elements must be optimized to eliminate two acoustic problems, commonly referred to as "echo" and "barrel effect." To the person at a network location listening to another person speaking from a second location, the listener experiences the illusion that the talker is at the bottom of a barrel.

This problem is aggrevated by live rooms. The live room has an abnormally high content of reflected sound because there are insufficient absorbtive surfaces to dissipate the acoustic energy. Consequently, the sound energy decays slowly, or the room is said to have a long reverberation time. The incident or direct sound is transmitted followed by transmissions of the reflected sound. The reflected sound is delayed from the incident sound and thus creates the barrel effect.

Basically, the barrel effect occurs in two situations. First, when the transmit preamplifier gain is increased so the speaker can be picked up across the room from the microphone. With the gain that high, the incident and reflected sounds will be transmitted creating the problem. The second occurs when the public address level is set too high. The talker's incident sound is picked up by the microphone and amplified to such a level that the reverberant sound from the sound system becomes significant relative to the talker's incident sound.

Minimizing these problems begins with selecting a highly directional cardioid microphone. The cardioid microphone responds well to signals directly on the front axis of the microphone and the response drops off sharply on the sides and rear of the microphone.

A second step towards a workable solution is to fix the transmit preamplifier gain. The fixed gain requires that the talker be within 12 to 18 inches of the front of the microphone to transmit an acceptable signal level. This eliminates the first cause of the barrel effect mentioned above. A benefit of this restriction is minimizing the transmission of room noises during the time a talker's microphone is on. To the remote network listener, the talker's voice is heard at a considerably higher level than the background noise within the room. Consequently, a good signal-to-noise ratio exists. In addition to limiting the transmit gain, the frequency response of the transmit preamplifier is tailored for speech intelligibility and telephone line compatibility.

To eliminate the second cause of the barrel effect, the public address level was fixed in relation to the receive level. As the receive is adjusted for a comfortable listening level, the public address level is generally maintained below the level at which the barrel effect begins. As a backup measure, a defeat switch eliminates the entire public address signal in an otherwise impossible acoustic situation.

The second acoustic problem to be eliminated is "echo," a common problem in telephone circuits. Echo is that portion of a transmitted signal which is retransmitted by the receiving end of the signal path. Generally, this signal is delayed in time by the transmission path. On ETN, echo occurs when a signal is received, amplified in the classroom, and transmitted back through ETN by an open microphone. Electronic delay is encountered in the telephone network and acoustic delay is encountered in the classroom. This echo is eliminated with the Model 604 by inserting 40 db of loss in each loop which is a potential source of echo, 20 db of loss in the talker's receive channel, and 20 db in the listener's transmit channel.

This is accomplished in the Darome Model 604 convener by the addition of voice operated switches S2 and S3. The switching operates as follows: with the microphone switch depressed and signal present on the microphone and transmit channel, a portion of the signal is fed to a preamplifier which in turn attenuates the receive channel by 20 db, that is, S2 opens. The figure of 20 db was arrived at by considering the number of stations involved, a typical number of microphones that might be in operation at any given time, and the amount of delay expected. This 20 db loss in the receive channel inhibits network signals from being amplified in the room and retransmitted on an open microphone. To further understand the operation, consider a unit at a station where the transmitted signal is received, that is, a listener's location. The listener's channel has a signal sensor on its input. With a signal present on the receive channel, the transmit channel is inhibited by 20 db (S3 opens) in the same way the receive channel is inhibited at the station where the signal is transmitted. In other words, if a student in a listening room were to press his microphone and attempt to speak with a signal present on his receive channel, he would be inhibited by 20 db.

Maintaining the signal-to-noise ratio on the POTS station equipment requires similar precautions, since the constraints are similar. That is, maintaining a sound reinforcement system in typically live rooms and obtaining a good transmit signal level. The transmit signal is picked up by the same cardioid microphone and amplified by a fixed gain preamplifier. The preamplifier response is tailored for speech.

The public address level is adjusted by a screwdriver control which is relatively inaccessible. The PA level is unaffected by the receive level control. Thus, the PA level can be set, and the sound system checked for stability prior to connection to the telephone facility. The wider signal level variations encountered on the DDD network dictate this control mechanization.

Echo on the POTS station equipment is eliminated by the simplex operation. The Model 610 is either in the transmit or receive mode, and therefore, cannot retransmit a station receive signal.

The simplex operation offers one signal-to-noise advantage. With the receive normally off (S2 open), telephone line noise below the gain threshold is not heard. The distraction of normal telephone line crosstalk is minimized since it can only be heard in the presence of a signal with sufficient amplitude to operate the voice switch. Therefore, the listener is not able to focus his attention on the background noise.

Maintenance

From the viewpoint of maintenance, the major constraint is the number of ETN units and their statewide distribution. The first question which arises after a station outage is, what has failed, the telephone line facility or the conference unit itself? The solution implemented in the design was to incorporate a loopback test feature. With the unit plugged into an ETN outlet, the loopback switch (S1) is placed in the test position. This switch ties the telephone line's transmit pair to its receive pair and internally disconnects the unit from the telephone line. A telephone company technician can then determine if the line is operational from the central office without dispatching service personnel to the classroom site.

As a second step, the conference unit itself can be tested. Activating the same loopback test switch also shorts the unit's transmit pair to its receive pair. By turning the receive to maximum volume and talking into a microphone, a signal is transmitted and received by the same unit. While the audio is distorted by the gating, it does verify the unit's operational integrity.

Maintenance on the conference unit itself is minimized by having all the internal electronic components on one plug-in printed circuit board. The customer's service department can replace the defective board with a spare and return the defective board to the manufacturer for repair. The university also has the option of replacing the entire defective unit.

Another potential source of maintenance on equipment is the operational complexity. The Model 604 controls have been minimized. There is no AC on/off switch; an LED indicates that the unit is plugged in and has power coming to it. A single control operates the station receive and public address levels. A PA on/off switch (S5) is provided, but is relatively inaccessible once the convener is set up.

A loopback test switch was mentioned above. The switch chosen was a spring return slide switch. This provides a simple operator presentation and maintains the unit in its normal mode of operation.

The POTS station equipment is a completely solid state design with integrated circuits for the majority of the circuit functions. For maintenance and test reasons, the circuitry is contained on a single plug-in printed circuit board. G 10 glass epoxy printed circuit material was chosen for strength against the abuse that portable equipment must endure.

A LED indicates when the Model 610 is actually on the telephone line. The unit left on is equivalent to an "off hook" condition on a normal telephone. The indicator serves as a reminder to turn the unit off after the completion of the conference.

Again, the controls were kept to a minimum; a

receive control and screwdriver adjustment for public address level. Only one microphone is equipped with a switch to answer the phone line, but all microphone jacks are the same, allowing this special microphone to be plugged into any of the four chassis jacks.

The Future of Teleconferencing Station Equipment

The requirements of ETN at the University of Wisconsin-Extension provided the stimulus for the design of new teleconferencing equipment. These requirements are not unique to a university's continuing education program; they apply to any institution or business which has a frequent need to communicate with groups of geographically dispersed individuals.

The United States Army is one example. From 25 regular Army schools with technical specialties, information and training must be provided to hundreds of regular Army bases and thousands of Army Reserve Centers. Numerous companies have sales offices throughout the states and around the world. Training and management efforts using teleconferencing could economically replace a significant percentage of the personal contact which occurs in these companies.

To enhance the use of teleconferencing, Darome developed other conveners which utilize slides as a visual aid. An instructor at one location can make a presentation over a conference network with each location having a slide projector and a duplicate set of slides. The instructor can then move all slide projectors forward and backward at his discretion.

Other improvements to existing Darome equipment which are in various stages of completion include the following:

--Built-in telephone line protection and repeat coils. Regulations governing the interconnection of customer-owned equipment to the telephone network have been challenged in recent years. As these regulations change and permit direct connection to the network, the inclusion of the protective devices will be mandatory.

--Adding built-in dial and ringer on the POTS station equipment. This would eliminate the need for a telephone, thereby simplifying the setup time and operation.

Areas of improvement under design investigation include the following:

--Smaller microphones. For portable equipment, the weight and size advantage would be substantial. For a Model 610 convener, the microphones and cords require twice the storage space occupied by the basic unit.

--Noise Mitigating Transmit Techniques. Noise on a telephone circuit not only detracts from the conference intelligibility, but also creates annoying gating problems. This is particularly evident on the POTS station equipment. Improvements in overall noise levels, while using standard telephone circuits, will certainly extend the use of teleconferencing throughout business and education.

--2-wire POTS station equipment which more closely resembles duplex operation. The present simplex operation of, say the Model 610, requires some discipline on the part of the conference participants. A more conversational unit would meet less opposition in marketplace.

All of the above would improve the state of the art in teleconferencing. However, substantial increases in the usage of teleconferencing will occur as it becomes as easy to use as the telephone itself. This means having customer operated conferencing equipment. Whether the conferencing bridge is on the customer's premise or is part of the telephone company central office should make little difference. The important feature will be to have the equipment available for use at the customer's option. Placing repeated conference calls could be done by a programmable dialer. The dialer could store the group of telephone numbers and originate the calls on demand or on a predetermined schedule.

The setup of the station equipment for short term usage could be greatly simplified by wireless microphones. The ability to pass microphones around the classroom or meeting room would facilitate more extensive participation. Other benefits which would occur are size and weight of the equipment.

Another development for the future is an individual student-type convener. The unit could be assigned to the student at the time of enrollment for a particular course.

For permanent installations in the "board room" category, a more sophisticated system is required. A modular, tabletop system which includes all microphones and speakers would circumvent an expensive custom installation. At the same time, it could provide a very usable teleconferencing system.

The telephone network is a natural teleconferencing vehicle. As special segments of educational requirements expand, a satellite could be used for nationwide programs. Closed circuit television could provide a mass medium for education. The student could not only obtain the video presentation, but through the use of an adapter, enter into two-way discussions with the instructor and other students.

The Distribution Network

The distribution network for ETN is leased from the Wisconsin Telephone Company. The network is provided as a private line talk, multipoint service. With the exception of the ICS studio control facility, the equipment, facilities, station terminations and portable station equipment are furnished by the Telephone Industry of the State of Wisconsin. The Wisconsin Telephone Company furnishes most of the backbone facilities as well as bridging and test locations. The Independent Telephone Companies furnish some of the facilities, such as bridging and station terminations. Portable station terminations are provided jointly by the Wisconsin Telephone Company and the General Telephone Company of Wisconsin. Many people and companies are involved in a coordinated effort by the Telephone Industry to provide a uniform grade of service throughout the State of Wisconsin.

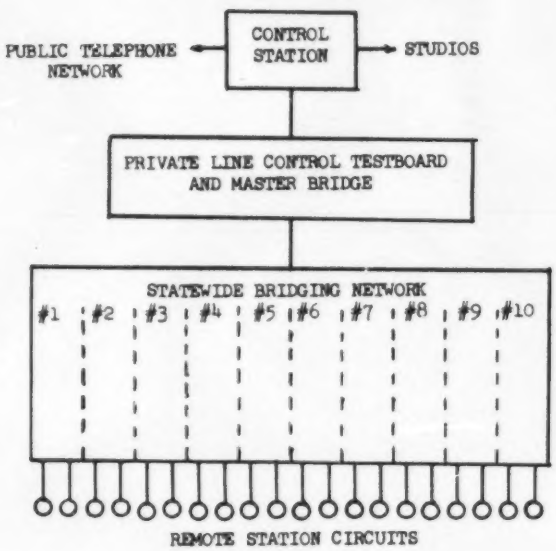
The Wisconsin Telephone Company coordinated the design and installation of the ETN. Uniform equipment

and facility specifications were agreed upon and standard station installation procedures were specified in detail. Taking these facts into consideration, this description of the network will not include the many junctions of ownership of facilities and variations of equipment due to ownership.

To start the description of the distribution network, consider the block diagram in Figure I as identifying the major elements.

FIGURE 1

BLOCK DIAGRAM OF MAJOR ELEMENTS OF ETN DISTRIBUTION NETWORK



Each major element along with its component parts will be described separately. The interconnection of the elements into a system will be described by identifying the interface between elements.

The Control Station

The control station is quite complex. The ICS concept of network administration and control dictates this complexity. Major components of the control station, identified in Figure 2, can best be described individually.

The Control Bridge

The heart of the control station is the 4-wire 6-way resistive bridge (Wescom 416). This bridge combines the three major inputs into a unified line feed for the ETN: the ICS studio control input is combined with the Public Telephone Network input and the input from remote studios or other networks. The output of the control station bridge feeds a line driving repeater.

Each control bridge input is equipped with a Darome Convener switched gain repeater package (Figure 3), which is specially constructed for 19 inch relay rack mounting. This switched gain repeater provides the electrical equivalent of the portable remote station package. Each input to ETN, thereby, has the same switched gain characteristic.

The Public Telephone Network Bridge

The "Public Telephone Network Bridge" makes stations served by POTS available for interconnection to the ETN. Again the bridge used for this service is the 4-wire 6-way resistive bridge (Wescom 416). Each telephone line feeding the bridge is specially constructed to provide a 4-wire interface to the bridge. In addition the 4-wire design is extended to the serving telephone company central office switching machine.

FIGURE 2

CONTROL STATION OF ETN DISTRIBUTION NETWORK

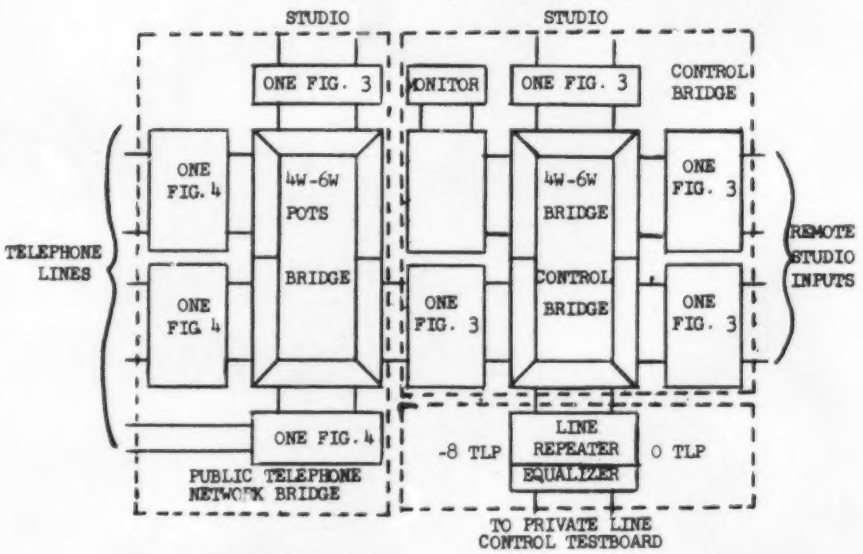
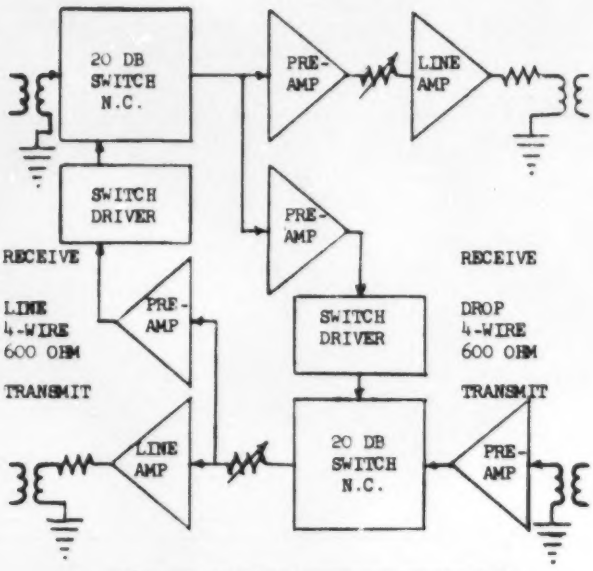


FIGURE 3



VOICE CROSS GATED REPEATER EQUIVALENT
TO DAROME 604 CONVENER - 4-WIRE

At the 2-wire interface with the switching machine, each telephone line is equipped with a 24-type repeater. The central office transmit leg of each repeater is equipped with a low pass filter and a compression amplifier.

The filter serves to limit conditions which would create singing or echo at the 2-wire junction with POTS service. The compression amplifier serves as a level control gate for all signals entering ETN from the Public Telephone Network. Using the signal level from an intertoll telephone call as a reference, the amplifier provides full amplification to signals at or below this level range. Input signals that are higher in level are soft limited by the feedback circuitry of the amplifier.

The deviation of peak input signal levels from the reference level selected was observed to be -3 db to +10 db. The deviation of output signal levels for the same observed sample was -3 db to +3 db. This range appears satisfactory for interconnection to the private line network. Since the signals being limited generally have a high signal-to-noise ratio, little noticeable signal to noise ratio degradation may be attributed to the compression amplifiers. Conditioned in this manner, a program from the public telephone network is compatible with the private line characteristics and program of ETN.

The Line Repeater

The line drive repeater connects the control bridge to the local cable pairs feeding the Plant Control Testboard. In so doing it sets the transmit

FIGURE 5

COMPRESSION AMPLIFIER OUTPUT SIGNAL
LEVEL DEVIATION AS A FUNCTION OF
INPUT SIGNAL LEVEL DEVIATION

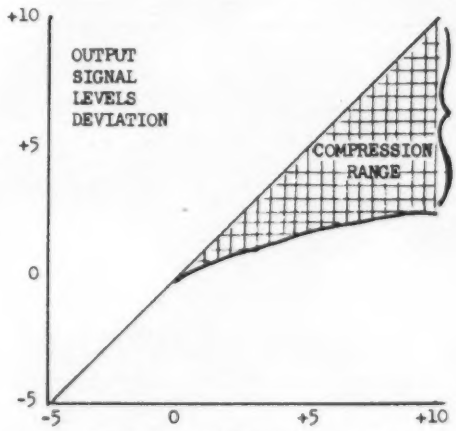
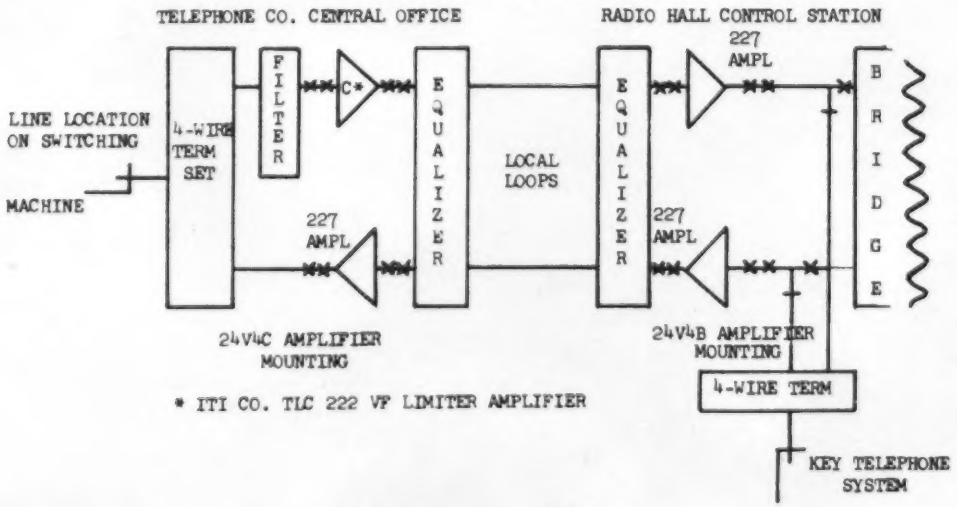


FIGURE 4

4-WIRE BRIDGE TELEPHONE LINE



* ITI CO. TLC 222 VF LIMITER AMPLIFIER

level to the line at 0 db Transmission Level Point (TLP), and the receive level from the line at -8 db TLP. These line interface levels are also used at each remote station interface throughout the network. The limiting signal level at the line input is 0 VU.

Normally a telephone instrument oriented system design would use -16 db TLP receive level. This signal level causes the telephone instruments to deliver the correct amount of acoustic power to the ear. The design deviation to -8 db could be made because telephone instruments are not used on ETN. Zero dbm receive level was not used since this level would have required active amplifiers at remote stations. The change to -8 dbm provided added signal-to-noise ratio margin for ETN.

The final function of the line drive repeater is to provide line equalization to improve band pass characteristics of the cable pairs between the Private Line Testboard and the Control Station.

The Private Line Control Testboard and Master Bridge

For ETN, the domain of the Madison Private Line Control Testboard (PLCTB) includes all telephone industry provided equipment and facilities used on the network. This responsibility is shared with regional private line serving test centers. For the purpose of this description, only equipment and facilities terminating on the Madison Testboard and the master bridge will be considered.

The cable pairs connecting the control station to the Private Line Control Testboard are accessible at the testboard normal patch jacks. The drop side of these jacks feeds the master bridge of ETN through a line equalizer and repeater. The Master Bridge interconnects the control station through region control circuits to the ten regional distribution networks. This bridge does not connect directly to remote stations.

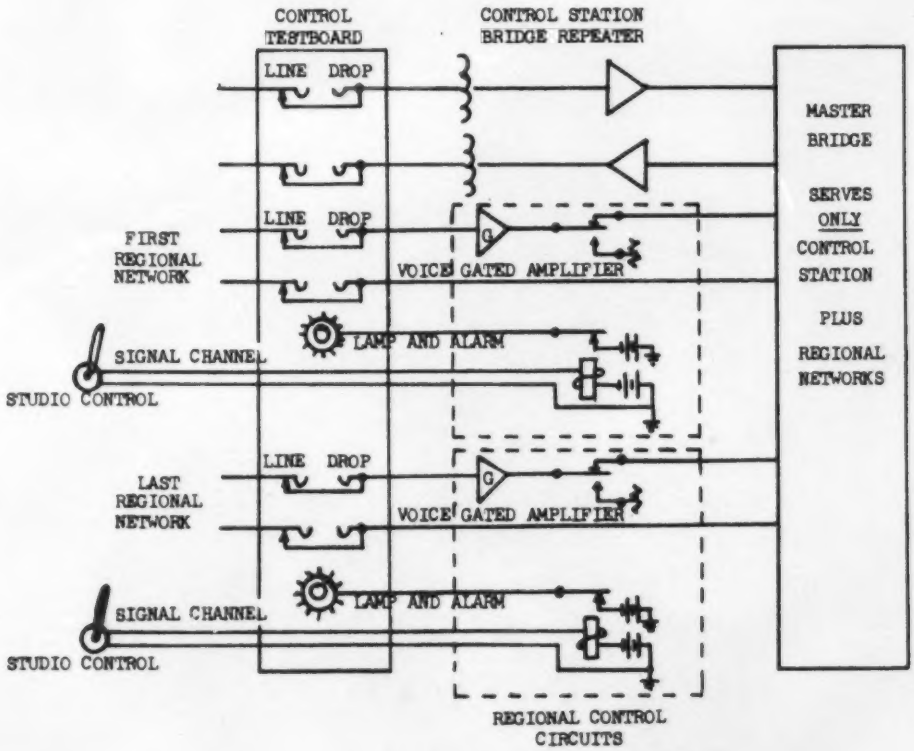
Each regional control circuit is connected by a signal channel to the Control Console at Studio Control for ETN. Each signal circuit operates a relay which 1) opens and terminates the receive signal path from the regional associated, and 2) signals the control testboard by operating a testboard lamp and alarm circuit. This function serves to isolate a regional master bridge receive port from the rest of ETN. (Trouble in one region does not affect other regions.) It also serves to report a regional trouble condition immediately to the PLCTB.

In its normal state the Master Bridge serves as a one-way distribution network passing program from the control station to each regional network. The voice-gated amplifier in each regional Master Bridge receive leg is blocking regional noise from the Master Bridge. This is the condition with all remote stations listening to program. In this state, ETN is a broadcast-only conference circuit.

When a remote station addresses the ETN, the associated regional voice-gated amplifier gate triggers, transmitting the signal to the Master Bridge

FIGURE 6

MASTER BRIDGE AND PRIVATE LINE CONTROL TESTBOARD



99

and on to the other regions. All stations receive the signal emanating from the remote station. In this state, ETN is a two-way conference circuit.

In the same manner, if a carrier channel or cable pair within a region were to fail, the noise generated would also trigger the voice-gated amplifier. This would, in turn, disable the entire ETN. The Studio Control console, by operating one control circuit relay at a time, can isolate the offending region in seconds, thus restoring nine of ten regions to service. The control testboard then swings into action, alerted by the operated lamp and alarm circuit associated with the offending region. They immediately contact the regional serving testboard involved. Together they further isolate the regional problem to a Primary Bridge leg. The offending leg is isolated from the primary bridge. The region, less the offending stations, is restored to service within minutes of the failure. Normal trouble clearance procedures are then applied to the offending stations.

The control testboard also receives trouble reports directly from remote stations when they experience difficulty. All customer trouble reports are made directly to the Madison PLCTB by ETN users.

One additional tool serves the PLCTB. A monitor leg from the Master Bridge is terminated in a portable speaker at the board. This serves the testman by providing immediate access to monitor trouble on the network without interrupting programs in progress. It also serves as a quick test for early hour testboard coverage. Trouble indications that appeared during the uncovered night hours can be investigated before the first ETN program in the morning.

The Statewide Bridging Networks

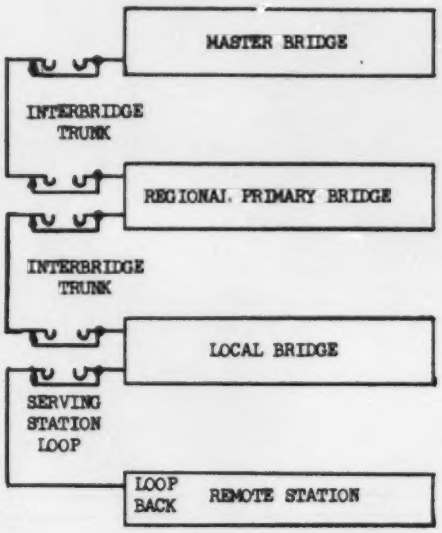
The practical size limit for multipoint private line telephone networks is twenty stations. The noise level, created by the multiple facilities and circuit equipment terminations connected together, is usually the limiting factor. ETN, with 200 ports, is able to provide service that satisfies users because the network is constructed from ten noise-isolated regions. Each region of the network serves 20 stations. Regions are isolated by the voice-gated amplifier at the Master Bridge regional receive port. The regional arrangement limits the noise level experienced at a remote station to noise generated by the facilities and terminations within a region.

When a remote station addresses the ETN, the voice-gate isolating its associated region from the Master Bridge opens. This allows the signal along with its accompanying noise level to enter the Master Bridge. The remote station signal and its accompanying regional network level is fed through to the other regional networks. The combining of this signal and noise with the steady state noise in the other regional networks raises the noise level in other regions. Under normal operating circumstances this is the highest noise level expected within a regional bridging network. (Equivalent noise to a station on a 40 port network for the period of conversation from remote station plus 100 milliseconds.)

Network Limits. Each region is served by one primary bridge which in turn serves remote stations either directly or through local bridges. The

FIGURE 7

TANDEM LINKS - MAXIMUM NUMBER FROM MASTER BRIDGE TO REMOTE STATION



maximum number of tandem interbridge trunks within a region is two (Figure 7). On an interregional basis, this limits the number of tandem links in the transmission path between remote stations to four mid links (between bridges) and two end links.

Two point private line talk service is designed to meet an overall frequency attenuation distortion requirement as listed in Table 1. Multipoint service requires the same overall result. To attain this result each link is given a special consideration requirement also listed in Table 1. Each link is measured and maintained separately. Overall results are not measured for installation or maintenance purposes.

TABLE 1

PRIVATE LINE BANDWIDTH CIRCUIT ATTENUATION DISTORTION REQUIREMENTS (DB)*

FREQUENCY RANGE-HZ	OVERALL 2-POINT	MULTIPOINT END LINK	-4 MID LINK MID LINK
500 - 2500	-2 to +8	-0.8 to +3.5	-0.8 to +3.0
300 - 3000	-3 to +12	-1.5 to +4.5	-1.0 to +4.5

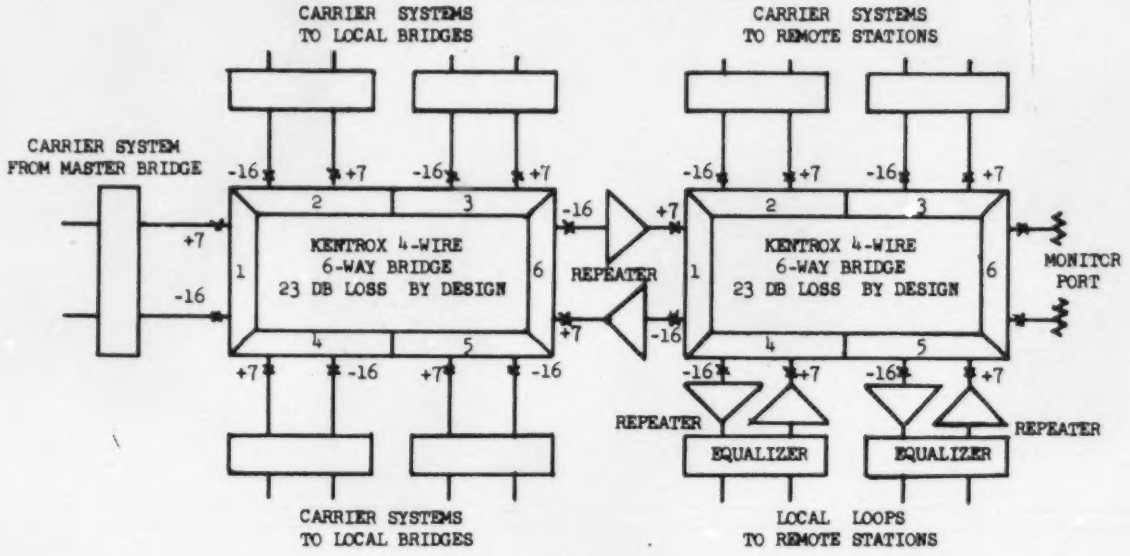
*DEVIATION FROM 1000 HZ LOSS
(-) LESS LOSS
(+) MORE LOSS

Network Equipment

The equipment used to provide the distributing network bridging arrangements consists of testboard normal jacks, 4-wire repeaters and Kentrox 4-wire - 6-way bridges. Carrier terminals are interconnected directly to the 46-type bridges which have 23 db of loss. The bridge serves in place of 23 db pads between interconnected carrier channels reducing wiring and equipment components necessary at bridging points. A typical regional bridge interconnection is

FIGURE 8

TYPICAL REGIONAL BRIDGE



block diagramed in Figure 8.

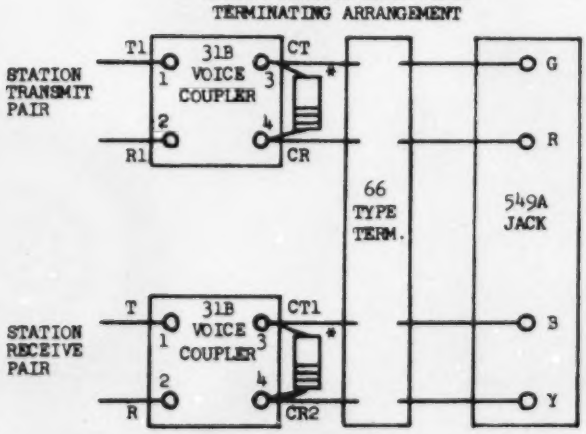
The Remote Station Circuit

Each remote station is served from a regional, primary or local bridge. The facilities involved include interoffice cable or carrier, in addition to local loops. Circuit equipment is added to the station circuit to provide signal level treatment, as well as frequency attenuation and bandwidth equalization. The hand-wired station equipment provides a standard 4-wire termination and wiring to 4-wire telephone jacks.

The remote station circuit is of modular design. Two standard modules have been established. The first type is used when the serving bridge port location is other than the serving central office for the local loop to the station (Figure 10). The second type is used when the serving bridge port and the station loop terminations are in the same wire center or central office.

FIGURE 9

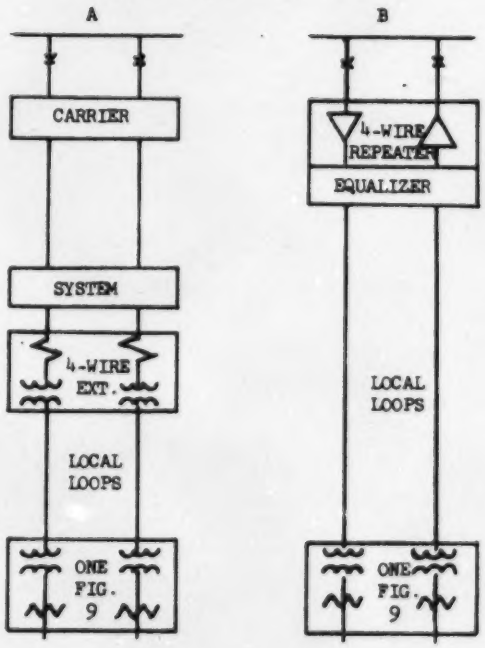
REMOTE STATION HARD WIRED
TERMINATING ARRANGEMENT



*1500 OHM 1 WATT RESISTOR SERVES AS PARTIAL TERMINATION FOR STATION WHEN PORTABLE EQUIPMENT IS NOT CONNECTED TO JACKS.

FIGURE 10

REMOTE STATION CIRCUIT MODULES



Using The Transmission System To Overcome Network Obstacles and Constraints

The difference between a mediocre transmission system and a superb transmission system is fine tuning. In the case of ETN, the transmission system appears ordinary enough, but there is evidence of fine tuning. Starting at the control station and proceeding through the system, fine tuning is accomplished by these specific details:

1. The unique blending of POTS and studio programming using the ITI limited amplifier to equalize signals levels.
2. The uniform switched-gain repeater characteristic of signal treatment for all network ports.
3. Optimizing the network line receive level to -8.0 db TLP.
4. The Master Bridge concept to combine regional networks.
5. The regional control circuits utilizing the ITI 1130 voice-gated amplifier to isolate regional noise level.
6. The relay switching within the regional control circuit for customer initiated maintenance action.
7. The two interbridge link network design for improved frequency attenuation performance as well as rapid trouble isolation. (Overall design is four links but studio to remote station is two links.)
8. Uniform bridging configuration and equipment to minimize design and maintenance practices.
9. Passive hard-wired station terminations.
10. Uniform station installation instructions for Wisconsin Telephone Company stations as well as Independent Telephone Company stations.
11. Uniform Testing instructions distributed with Special Service Work Order to each installer and testman.
12. One trouble report center for all stations on network.
13. Station loopback feature provided by portable station package to provide speed testing.
14. The usage of specialized equipment to hand tailor the network.
    A) TLC 222 VF limited amplifier[(a)]
    B) TLC 1130-1 voice-gated amplifier[(a)]
    C) Kentrox 4-wire 6-way distributing frame mounted bridge with 23 db loss design.[(b)]
    D) Darome switched gain repeater at each ETN station port.[(c)]

(a) ITI Electronics, Inc., 369 Levington Avenue, Clifton, N.J. 07015

(b) Kentrox Industries, Inc., 14335 N.W. Science Park Drive, Portland, Oregon 97229

(c) Darome, 711 East Diggins Street, Harvard, Illinois 60033

Since system design must be user sensitive, each of these fine-tuning features was introduced into the transmission system design as improvements were deemed necessary. As feedback from the user indicates a weak spot, a solution eliminating the weak spot is required. This network design is not constrained by hardware, Telephone Company, University, or even normal maintenance practices. History of growth has demonstrated ETN to be truly user sensitive. Each network improvement feature is instigated by user feedback.

Future Speculation

There is no time to be complacent in a system which plans to meet user requirements: Continuing feedback indicates that the user is always reaching to improve his lot. Where can the transmission system be improved to meet this challenge?

Improve Low Station Usage Time. The first apparent ETN weak spot is low individual station usage time. Although the network usage time is fully committed, there are many stations idle for any particular program. ETN could be more effective if small groups of stations could be switched into POTS bridging arrangements. These POTS bridges could then provide additional program capacity for the stations so connected. It is conceivable that regional POTS bridges would meet this need.

If a POTS bridge were established, it could be used in reverse to bridge POTS stations to ETN at Regional Bridges. This would provide programs to stations which are not now economical because of low usage. This bridging could be best accomplished on a meet-me basis of switching (remote station controls access to network).

Privacy Feature For Control of Stations Receiving Program. There is always the possibility that stations not contracting for a program could bootleg the program. This is the normal state of the network. Each station has access to the network at all times. A privacy feature, somewhat simplified from SS3 signaling system now offered for multipoint private line systems, could be developed to channelize ETN for major station groups, e.g., hospitals, libraries, court houses, University of Wisconsin-Extension Centers.

User Feedback Requirements. Future changes in this Telephone Industry provided transmission system will be dictated by the feedback from user surveys. At this point, it is difficult to predict the developments this feedback may require. Suffice it to say, every effort will be made to expand the educational opportunities offered through this combined University and Telephone Industry offering.

Studio Control Complex

The ETN studio origination and control complex at Old Radio Hall on the University of Wisconsin-Madison campus, is equipped to provide operational control of the network. Within the complex are studios from which instructors broadcast their programs, and the control room, which is manned by a trained engineering technician who handles all equipment and adjustments during each program.

The instructor has a minimum of technology to cope with. During his presentation, he need only speak into a microphone, and he can hear a comment or question from the network through a loudspeaker. Unlike a regular ETN station microphone, there is no push-to-activate switch. All controls are handled by a trained engineer.

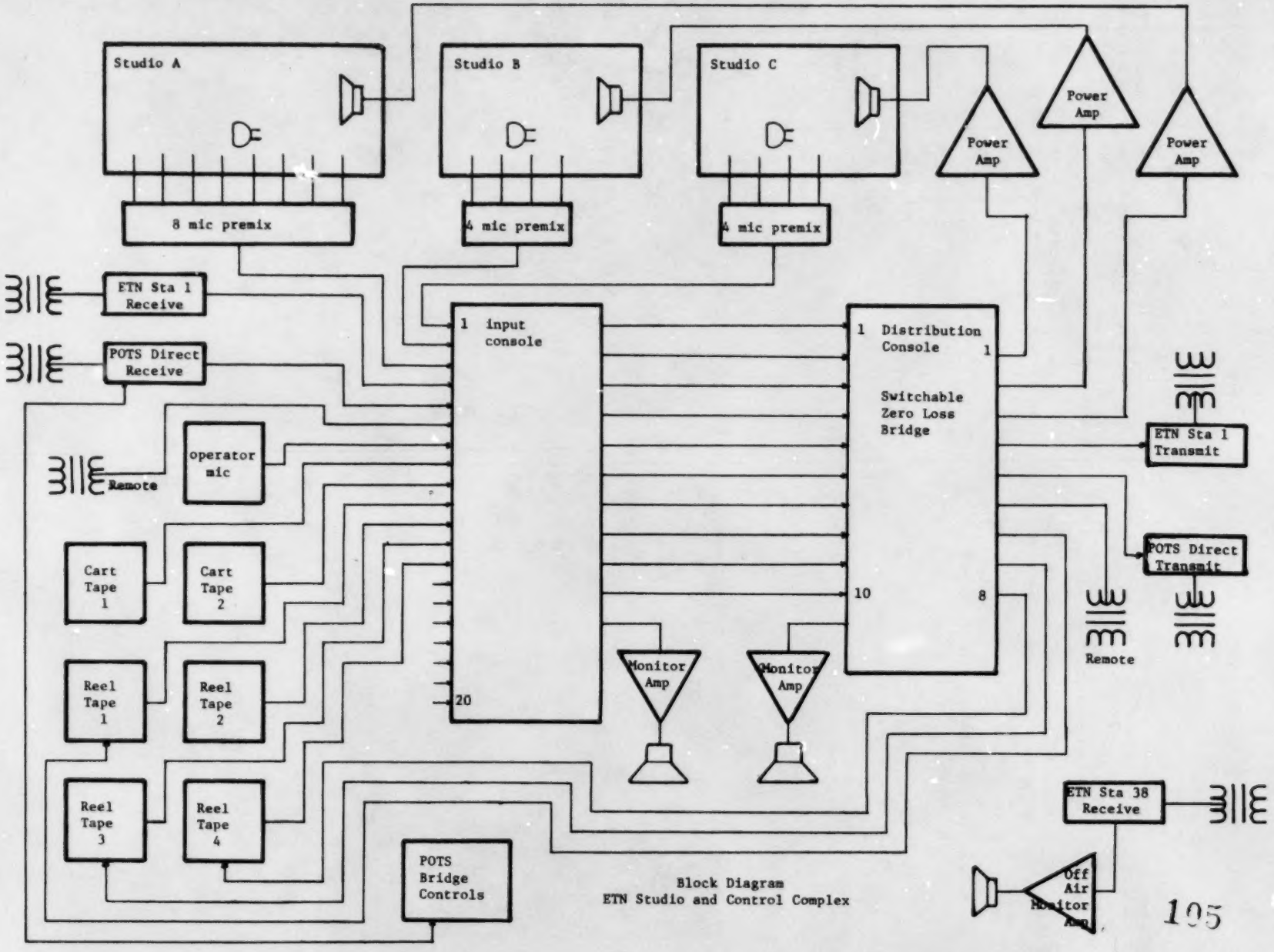
The studios and control room include the necessary equipment for use by the operator to guarantee a smooth trouble free program. Because the operator runs all technical aspects of the program, the instructor is free to concentrate his efforts on his material and presentation. The operator's role can be illustrated most clearly by a description of the steps involved in setting up and operating a typical program.

Before a program, the operator refers to a daily schedule and program format book, similar to a radio broadcast conformity sheet, which outlines the particular technical and operational requirements for that program. The studio is arranged with enough mics and chairs for participants, and, if slides or visuals are to be used, an appropriate projector and screen are set up. Insert tapes are loaded on tape machines and another tape machine is used to record the entire program.

The switches and controls on the input and distribution consoles are arranged in accordance with operational requirements. When the instructor arrives, the operator greets him and reviews the program format to check for any changes. If a participant is to be connected to ETN via POTS, the operator places the call, gets the party on the line and, when ready, connects him to ETN. A program introduction on cartridge tape is played, the studio microphones are turned on and the instructor begins.

During the program the operator plays the tape inserts on cue from the instructor. If a problem develops with the control room equipment, he quickly transfers to a back up unit. If he hears trouble on the network, such as noise, etc., he uses controls to isolate the offending region and reports it to the

ETN CONTROL ROOM



Block Diagram
ETN Studio and Control Complex

telephone test board which then helps to isolate and orrect the problem. Most of the time problems do not occur, however the operator continuously monitors the program operation in case of trouble. When it does happen, all efforts are made to minimize the effect on the program.

The ETN control room is centrally located, with studios A, B and C adjoining on three sides. The operator and instructor have visual contact through large windows. The studios and control room are sound proof, and access to the rooms is provided through connecting doors and soundlocks.

Studios are furnished with conference style tables surrounded by comfortable padded swivel chairs. Studios B and C accommodate up to 8 people, while Studio A is much larger and can hold class sizes of about 40 students. Various table and chair arrangements are used depending on class size, although the smaller studios are generally left set up in the conference table arrangement.

The studios are treated to minimize reverberation and are essentially dead acoustically. Four high quality cardioid microphones give proper coverage in Studios B and C respectively, while up to eight are used in Studio A. In very large classes, no attempt is made to give a mic to each student.

ETN ORIGINATION CENTER

Generally, they share a single microphone provided at each table.

The microphones are assigned to each studio and are terminated in a premix amplifier which is mounted in the control room. Here the operator can control the gain of each mic path. The outputs of the premix amplifiers are balanced line level and appear as an audio source at the input console.

Audio Tape Machine

Professional audio quality tape recorder/players are used in the ICS operation. Though the wide frequency response and low noise figures are not needed on ETN with its limited band width and inherent noise characteristics, they were chosen for other qualities: long term reliability, serviceability and ease of operation. Ampex AG350 has been in continuous use for ten years. Equipment includes four reel-to-reel machines and two broadcast-type cartridge machines which are employed to insert introductions, logos and other short segments used regularly in programs.

A standard tape-and-track format has been established. Seven inch reel tapes of either 1.5 mil or 1.0 mil A-V grade are recorded or played at either 3.75 or 7.5 ips 1/2 track mono. (Generally, 3.75 ips tape speed is used). Insert tapes are previewed and processed to adjust any deviations to these standards if needed. Maintaining these standards make it possible to quickly provide tape copies of the programs in either reel-to-reel or cassette, using high speed duplicating equipment. The output of the tape machines appears as audio sources at the input console.

The cassette format is used in the control room on occasions, generally as playback of an insert. Until recently cassette machines were not sufficiently reliable to be used for program mastering.

Other Audio Sources

A control room microphone allows the operator to talk to any point on the network. This mic can be used when assistance is required or if a trouble condition is to be cleared. Remote lines, provided to a number of services and class rooms outside Old Radio Hall, are used when programs originate from these points.

The ETN Station #1 receive port (the studio receive) appears in the control room and is the interface with the telephone company bridging equipment. The POTS bridging and conferencing features can be used independently of ETN when recording a program insert of a conference call with a studio group. This appears as the POTS (DDD) receive direct, and is an interface with telephone company provided equipment. These sources also appear at the input console.

Input Console

The input console, a modified radio broadcast control board, is used for a number of its basic features. It is the appearance point for all the audio sources. Input circuitry provides the necessary impedence matching and signal amplification or attenuation needed to properly terminate the varied audio source equipment. The console contains ten input channels with fader control of source levels and A or B source selector switch which doubles the sources readily available to twenty.

A program-audition select switch connects the audio source directly to the distribution console or to an audition monitor and amplifier and VU meter. This feature allows the operator to cue and listen to any of the audio sources without connecting them into the network or program.

Distribution Console

When a channel is switched to program at the input console, it is tied directly to its respective input at the distribution console. The distribution console is a switchable, zero loss bridge with ten inputs and eight outputs. Any combination of inputs can be tied to any combination of outputs. Isolation greater than 80 db is maintained between the inputs. Each of the outputs has a level control and on-off switch. The output amplifiers will drive a 600 ohm line to +14 dbm, enough power to meet most interface requirements. The outputs are tied to various points in the system and each feed point receives a combination of all other signals except its own new source. As an example, the speaker mounted in the studio is powered by an amplifier which is fed by one of the distribution console outputs. With the proper selection of source switching, the studio speaker receives all other signal sources, but not the signals from the studio microphones. This feature is needed to maintain the necessary 4-wire isolation integrity to be compatible with the ETN transmission system. Outputs are assigned to tape machines for recording, to ETN station #1 transmit to tie the studios to the rest of the network, to POTS direct and to other studio monitors.

Monitoring

Monitoring functions are an important tool for the control room operator. To successfully isolate trouble, he must be able to monitor the signals at each stage in the process.

In addition to the audition monitoring mentioned earlier, the operator is able to monitor any of the eight distribution console outputs. The program monitor amplifier and VU meter can be selectively switched to any of the outputs without loading or affecting it. Thus, if a low level report is received, the operator can check the outgoing level quickly and correct it if necessary.

Another monitoring feature is similar to a broadcast off-the-air monitor. A sample of the receive signal for ETN Station #38 is fed to a monitor amplifier speaker and a VU meter. Station #38 appears in Old Radio Hall. A proper signal appearing at this monitor point assures the control operator that Station #1 transmit signals are leaving the building and getting through the master ETN bridges at the telephone company.

Patch Panel

Signal runs between equipment are routed through a patch panel. For example, the output of a tape machine appears on the tips of a patch port. The input to Channel 3A of the input console appears on the tips of another patch port. If the output of the tape machine is to be assigned to input Channel 3A, the tips are connected together through the normals. Connections between the input and distribution consoles also appear at the patch panel in this manner. A patch cord plugged into one of the patch ports breaks the normal connection. This feature provides versatility in equipment interconnection arrangements and also facilities isolating or bypassing faulty equipment. The patch panel provides a termination point for numerous sources and feeds that are used only occasionally and, therefore, not normalled to an input or output.

POTS Bridge Controls

The POTS to ETN bridge controls are presented to the operator as shown in the picture. There are two independent sets of three lines each which appear operationally as a standard six button telephone. The third set shown is the ICS general telephone extension. In this case the push buttons are mounted on a panel and connected to a trimline telephone set. The control action is push-push with latching relays controlling the circuitry. The buttons are color coded, and lighted to indicate status. The controls permit versatile use of the lines available. Each set of lines can be used for a conference call and both sets can be bridged together providing a six party conference. Each set of lines can be used directly with the studio or tied to ETN. As an example, one set can connect up to three callers to ETN, while the other set is being used to record a conference call interview as an insert for a future program. This versatility allows ICS to make maximum use of the service.

Constraints

Consideration for signal-to-noise ratio is important here as well as with other parts of the system. Noise from outside the studio is minimized by using soundproofing techniques and noise generated within the studio is minimized by using highly directional microphones. Interaction between the studio speaker and the microphone must be kept to a minimum. The problem is the same as discussed earlier in relation to station equipment.

The gain and number of simultaneously open studio microphones is limited by the presence of the live monitor speaker. Too high a speaker level or microphone gain creates echo conditions. These echo signals can cause gating problems which result in interruption of the program.

Some increase in the range of microphone gain is accomplished by acoustically treating the studios. By making the studio acoustically dead, better advantage can be made of the directional properties of the various elements involved.

The control room evolved over a period of time along with the development of the rest of the network. Control consoles and equipment to meet the unique needs of the ETN control function were not commercially available, at least not at a practical price. The solution was to modify some equipment from the broadcast industry design and build the rest in-house.

Rapid growth and changing demands require a high degree of versatility in control room equipment. As more features are added, an increase in operational complexity results. It is important, therefore, to review the control operation periodically to reduce this complexity. Redundancies in controls can be eliminated and those features regularly used can be locked in a set of operational patterns. Effort spent in planning the console layout and control inter-relationships will pay off in a smooth operation and increased operator effectiveness. Electronic white noise and cross talk generated by control room equipment are minimized by utilizing proper design and installation techniques.

Future

As the use of teleconferencing in education grows, so will the need to maximize the use of available telecommunication facilities. ETN, instead of being a huge party line, will be broken into a number of smaller regional networks which can be programmed separately or tied together as program distribution patterns require. The trend toward smaller networks using POTS and on premise conferencing equipment creates another need for a technical supervisory control function.

A number of current functions and new features can best be controlled by computer:

--As part of the control complex the computer can automatically set up network arrangements as identified by enrollments.

--Networks using POTS can be automatically dialed and conferenced.

--Continuous circuit testing can be carried out and trouble shooting streamlined.

--Visual support equipment at all locations, such as a slide projector and video tape machines, can be simultaneously controlled from the origination point.

The computer can poll and register non-verbal responses from each station location. For example students could take a multiple choice exam in real time, with the results immediately tabulated.

One way of measuring the acceptance of program technical aspects is by student user assessment. The technical components of ETN and SEEN programs, along with several other areas, are systematically evaluated through the use of the Program Evaluation Checklist (PEC).

Students in a random sample of ETN and SEEN programs are asked to rate each of the statements on the PEC and determine how well the positive statement fits the description of the program. On a 0 to 9 scale, 0 represents minimum approval while 9 denotes maximum acceptance.

In 1975, after the new Darome Edu-Com II equipment had been in use for two semesters, a random sample among 632 participants gave ETN's technical components a mean rating of 8.45. With this degree of user approval, the future of teleconferencing and its associated supervisory control function is only limited by the creativity and ability of educators and engineers to adapt technology to serve outreach education efforts.

BIBLIOGRAPHY OF TELECONFERENCING PUBLICATIONS

Administration

Anderson, L. R. ETN-SCA-SEEN Dean's Advisory Committee Report. University of Wisconsin-Extension, Madison, 1973.

The Educational Telephone Network (ETN)--Subsidiary Communications Authorization (SCA)--Statewide Extension Education Network (SEEN) Advisory Committee of the University of Wisconsin was appointed to explore and reexamine previous guidelines established for ETN-SCA-SEEN operations. The general areas predefined were 1) program design, 2) publicity and promotion, 3) technical systems, 4) learning centers, and 5) operational procedures. The report is divided into the five subcommittee areas. Specific recommendations are included in the summary.

Anderson, Leonard. "Educational Telephone Network." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

When ETN, Wisconsin's Educational Telephone Network, began, county extension offices met with many problems. The author was appointed chairman of a committee to suggest procedures for the ETN system. The article lists the results of this committee and the guidelines which a later committee issued concerning program design, promotion, publicity, a technical system, learning centers and operational procedures. Additional procedures used by Monroe County Extension office for its 5 ETN outlets are included.

Daniel, John and Bertrand, Guy. "Telefun at the Universite du Quebec: (1) Teleconferencing." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

Teleconferencing has become an activity of increasing importance at the Universite du Quebec in the last four years. This paper describes, from both technical and organizational points of view, the development of the system and summarizes the results of studies on its use. The system has attained a high degree of user acceptance which provides a realistic basis for the future developments which are discussed.

Daniel, John S. "The Use of Teleconferences in the Administration of a Geographically Dispersed Organization." Unpublished manuscript, Teleuniversite, Universite du Quebec, 1975.

Teleconferences have been used in a routine manner in the administration of the Universite du Quebec for nearly three years. The author summarizes the experience acquired over this period for the benefit of other organizations which may be considering the adoption of a teleconferencing system.

Dick, Robert. "Staff Meeting by Telephone." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author gives an example of a staff meeting involving 350 people of the University of Wisconsin-Extension. The general benefits and limitations of such a meeting are cited. The shortcomings of such a staff meeting via telephone can be eliminated or minimized by adequate planning, and the author elaborates on this point. The importance of ground rules, rewarding good staff meeting performance, response mechanisms and confidentiality of responses are also discussed by the author.

Gold, Ben. "A Plan for Development of an Educational Telephone Network (ETN) to Extend Access to Educational Programs." Los Angeles Community College District, Division of Educational Planning and Development, Office of Instructional Development, Oct. 1973.

The model of the Outreach Development Process presented here is designed to increase access to education for district members not presently enrolled in one of the district colleges. The plan involves: identifying educational needs, determining if these needs can be met by the community college; determining which college should be responsible, scheduling and planning courses, developing educational strategies, selecting faculty, producing media, selecting a delivery response system, implementing a marketing plan, enrolling students, and evaluating results. The Educational Telephone Network (ETN) is a delivery-response system for extending access to educational programs. Procedures for district coordination of ETN development and an evaluation of an ETN course offered in the Los Angeles Community College District are provided.

Hanson, Wayne. "Telelecture in Minnesota." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The growth of the telelecture at the Agricultural Extension Service-University of Minnesota is given. Program development by Extension Specialists is explained; the responsibilities of staff personnel, the scheduling office, the Bell Telephone Co., the Dept. of Information and Education Aids are listed, and the evaluation results for the program (1970-72) are all given.

Legault, Frederic. "Telefun at the Universite du Quebec: (3) La Telegestion au Nord-Quest." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

This paper describes the development of administrative and educational teleconferencing in North Western Quebec and summarizes the results of a study held in Rouyn-Noranda.

Parker, Lorne A. "ETN-SCA Program Handbook." University of Wisconsin-Extension, Madison, 1969.

The purpose of the handbook is to establish a common understanding of the use of ETN-SCA by presenting some guidelines which may be useful to programmers using the system. Sections in the handbook include an explanation of the ETN-SCA systems, registration procedures, program preparation and presentation, the studio moderator, the local program convener, publicity, ETN-SCA evaluation and an appendix.

Seaman, Millie. "Operational Aspects for Program Planning." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

This article discusses the procedures and guidelines that are used today by University of Wisconsin-Extension Madison Programmers in implementing their programs. These procedures apply specifically to general types of programs, that is noncredit and credit programs involving registra-

tion. There are modifications to accommodate different types of programs. With a large variety of programs, procedures do not follow a rigid pattern; they are tailored to particular needs. Specific steps taken in setting up a program for ETN (Educational Telephone Network) are discussed.

Sparkes, J. J. "The Open University's Educational System." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author briefly describes the overall teaching strategy of the Open University in order to show what part the telephone plays today, and could play in the future.

Turok, Ben. "Telephone Conferencing for Teaching and Administration." Paper presented at a Seminar on Telephone Conferencing, Steering Group on the Development of Telecommunications in the Open University, University College, London, 18 July, 1975.

This paper examines the needs of adult education and suggests that telephone conferencing can provide much valued support. It shows that the technological and system problems involved are similar to those encountered by any large organization using Telecommunications extensively. Various remedies are proposed to overcome these problems and to lay the basis for the extension of this mode of communication.

Vogt, Richard. "Economic Intercity Service for Educational Networks." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author discusses the Telpak service, the operations of the Federal General Services Administration, and some significant drawbacks to extensive reliance on federal telpak. The conclusion states that "the ability of networks like ETN to provide economical telecommunications service depends directly on the efficiencies obtained by the state by combining all intercity requirements into an integrated and comprehensive whole."

Weinstock, Ruth. "British Open University: Media Used in Context." Planning for Higher Education, 4 (2:3/5), April 1975.

This profile of the British Open University is offered by Educational Facilities as one of a series to document the experience with the uses of technology in higher education. The emphasis is on its exemplary use of educational technology in context. A look at the details of how the Open University employs media to serve a large dispersed student body may benefit others who plan to expand or modify their own uses of educational technology.

Weinstock, Ruth. "Educational Technology Revisited: Outreach by Telephone." Planning for Higher Education, 4 (3:2/5), June 1975.

Examples in the pharmacy and medical fields illustrate the success of ETN as a means to relay newly completed research to practitioners. The article also deals with ETN's instructional techniques, and the technology involved in operating the system. Extension's relationship to the campuses is discussed as are the strategies that move teachers to accept the use of media. Finally, the author speaks of the cost of running ETN and the revenue involved.

Case Studies

Apfel, Lyn. "Changing Behavior via ETN Programming." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author states that use of the Educational Telephone Network (ETN) by the Department of Continuing Medical Education and the various evaluations based on pre- and post-testing indicated that the medium did not interfere with the educational process. In 1974 the department presented a Smoking Modification Clinic over ETN which reconfirmed that conclusion. However, most importantly, for the first time it documented for the department a reported change in behavior as a result of participation in ETN programming. The author describes that Smoking Modification Clinic.

Arndt, Jack R. and Weinswig, Melvin H. "An Analysis of Five Years' Experience with the Telelecture Method in Wisconsin." American Journal of Pharmaceutical Education, May 1974, pp. 208-13.

This analysis is concerned with determining the quality of telelectures as a continuing education activity based on nondidactic elements such as enrollment, attendance patterns and professional specialties of the enrollees. The paper includes an explanation of the telelecture method, a brief history of Wisconsin's ETN, and the design of Pharmacy ETN courses. The authors conclude that telelectures are convenient, economical, efficient and effective.

Bailey, Ann. "Retraining Emergency Medical Technicians Via Telephone Conferences." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author describes the Department of Continuing Medical Education of the University of Wisconsin-Extension's use of ETN and concludes that ETN provides access to, and efficient use of, a highly qualified physician faculty and a low-cost method of reaching large numbers of Emergency Medical Technicians.

Baker, Doris. "Wisconsin Social Workers Participate in a National Symposium--By Telephone." National Association of Social Workers Conference in San Francisco, University of Wisconsin-Extension, Madison, 1968.

The three-page paper includes an explanation of the format of the National Symposium of the National Association of Social Workers, the preparations made in 1967 and 1968 to hold the program, and a post-session appraisal. The latter section conveyed briefly the reasons for the positive response by the participants and an explanation for several disappointments experienced.

Blockstein, William L. and Durant, Winston J. "Continuing Education and the Tele-Conference Technique." American Journal of Pharmaceutical Education, 32, Nov. 1968.

The authors explain the teleconference technique employed by extension services in pharmacy, University of Wisconsin, as one of the means of providing for continuing education. The paper gives a brief description of how Educational Telephone Network (ETN) works, and tells of the early development of ETN programs in pharmacy.

Brown, Sandra M. "Telelecture: Appalachia's In-Service Classroom of the Air." The Instructor, 78, Oct. 1968.

The purpose of this project was to provide in-service instruction for fifteen teachers in five states, simultaneously. It was to demonstrate that a single course could be conducted via telephone in widely separated locations. Teachers in the project were Head Start instructors who were helping to introduce into their school systems new language arts material. Reaction to the telelecture project was enthusiastic.

Christiana, Ciel. "Long Distance Lectures." New York State Education, 51 (2), Nov. 1963.

Dr. Moses Hadas, head of Columbia University's Department of Greek and Latin, delivered via telephone 18 lectures on "Ideas in Antiquity," a graduate course in Greek drama. Dr. Hadas was elated by the reception of his lectures, and felt that the educational telephone network was an excellent way to fill the need of the student for a broader and better education in a flexible and inexpensive manner.

Cooper, Signe S. and Lutze, Ruth S. "Dial 'N' for Nursing." Adult Leadership, Dec. 1970, pp. 178-80.

The Department of Nursing, University of Wisconsin-Extension, Madison, has sponsored telephone conferences for practicing nurses since 1966. The project described in the article is an extension of an ongoing program. Entitled the Wisconsin Inactive Nurse Studies (W.I.N.S.), the project became operational in March 1969. The article gives the background for the project, discusses problem areas encountered in working with inactive nurses throughout the state, and difficulties in implementing the program. All evidence would indicate that the program is achieving its objective: helping the non-practicing professional nurse keep in touch and maintain her interest at a high level.

De Muth, J. E., Arndt, J. R. and Weinswig, M. H. "Attempt to Initiate Community Action Programmes in Venereal Disease Education in the United States of America." British Journal of Venereal Diseases, 50, April 1974, pp. 151-54.

"Venereal Disease and Society" was an educational course presented to 168 adults throughout the State of Wisconsin by means of a close circuit telephone network. The use of Wisconsin's Educational Telephone Network, according to the authors, represents a new and effective approach to venereal disease education. They felt that the importance of the course lay not only in the use of electronic communications, but in its attempt to motivate the students to initiate or advance venereal disease education in their own communities.

"Final Report on Two Inter-Institutional Programs Utilizing Amplified Telephone Communication." Submitted to the Fund for the Advancement of Education, Stephens College, Columbia, Missouri, Sept. 1966.

Stephens College used several new instructional devices in introducing two interinstitutional courses. The undergraduate course, "American Life as Seen by Contemporary Writers," supplemented discussion sessions with poetry readings on audio tapes and lectures via amplified, live telephone communication. The latter device also made possible conversation between prominent literary figures and students at all the participating colleges. Students evaluating the generally very successful course expressed a desire for more depth and less breadth in instructional approach. The course, "New Approaches to the Teaching of Mathematics," employed the Electrowriter, an instrument that transmits written images over telephone cables. The course was successful, but the Electrowriter presented occasional technical problems. Some students expressed a desire for more unity in the course material.

Hartje, George N. "Teaching Library Science and Telelecture." University of Missouri, Columbia, 1973.

An experiment was performed on the use of telelecture, amplified voice telephone, at the University of Missouri-Columbia. The telelecture exposed the students to another academic library administrator, and appeared to be a successful learning experience. Some changes regarding the technical details of telelecture are suggested to improve the use of this new instructional media technique which the author feels is applicable to library science education.

Hartje, George. "The Telephone and Education: A Case Study in Library Science." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

A brief historical summary of the use of the telephone in education is given. The author is concerned with the use of the telephone in teaching the discipline of library science. An example of the telelecture is given. The author's conclusion is "If our feedback is accurate, the results seem to bear out Kruck and Tversky's contention that telelecture is one of the most effective ways to bring outstanding resource persons to the classrooms." He further concludes that "our experiences prove that with imagination, energy, help, and planning, post secondary education can utilize telelecture in various situations."

Hartung, George and Gelman, Rena. "Something Different in In-Service Education." Today's Education, NEA Journal, May 1970.

In 1965, the University of Wisconsin-Extension, began offering continuing education programs over the Educational Telephone Network. The English Department of University Extension began its Educational Telephone Network Workshop for English Teachers in 1967. The authors discuss this workshop, other workshop sessions of 1967-68, and programs offered in 1969-70. They also talk about the reaction of participants and lecturers to the telephone courses and give some suggestions for the objectives they hold when planning and organizing English workshops.

Hornback, May S., and Brunchik, Helen L. "Party Line for Nurses." Nursing Outlook, 16, May 1968.

This article deals with a Department of Nursing's experiment with the telelecture system as a means to provide continuing education for nurses. The article covers the objectives and the organization of the series. An explanation is given as to how the telelecture system functions for the program "Call Nursing 1966." The article concludes by mentioning the technological improvements that have been made which allow a greater number of nurses to participate in a continuing education program.

Hugdahl, Edward O. "Wisconsin's Wired for Organists." Hurdy Gurdy, 4, Jan./Feb. 1976, pp. 26-7.

The author gives an explanation of how Wisconsin's Educational Telephone Network (ETN) was adapted to benefit organists and describes how electronic developments have allowed musical demonstrations, as well as spoken comment, to be transmitted. This flexible arrangement saves travel for the participants and allows talent to have a more widespread impact.

Johnson, Jay S. "Statewide-Wide Education Via Telephone for Wisconsin Clergymen: A Project in Adult Education." Department of Rural Sociology Memo, University of Wisconsin-Extension, Madison, July 1968.

The paper first outlines briefly the University of Wisconsin-Extension services to clergymen during the past half-century, with particular emphasis on changes in recent years. Second, it offers some analysis of the process and the results reported by clergymen-participants in the pilot 1968 state-wide telephone series.

Jolly, Joan and Madden, Charles F. "Amplified Telephone as a Teaching Medium: Description for an In-Service Science Seminar." Amplified Telephone as a Teaching Medium, Stephens College Educational Report: I, Columbia, Missouri, March 1965, pp. 9-10, 14-15, 36-37, 41-42, 56-58.

"The Improvement of Science Teaching" was a noncredit course coordinated from the Stephens College campus with six other colleges in the network participating. The program was highly successful and demonstrated that even for different types of subjects and for teachers using various instructional methods, the telephone, amplified and provided with additional microphones, can be an effective way of carrying on instructional programs.

Kruck, Donald and Tversky, Arnold D. "Classroom Communication: Telelecture." Audiovisual Instruction, Feb. 1971.

The authors discuss their experience with implementing a telelecture program in a Dover, New Jersey high school's social science department. Their main objective was the improvement of education through the use of the telelecture, having outside resource speakers participate in the classroom lesson. They felt that given opportunities to speak with authorities in various fields, the high school students demonstrated higher interest in classroom discussions and were able to develop research skills by preparing questions to be used during the telelecture.

LaZebnik, Jack. "The Amplified Telephone Program at Stephens College." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author explains how Stephens College in Columbia, Missouri, has used the Amplified Telephone from 1958 to the present, as a means of adding to the substance and range of the classroom. "We have found the procedure highly successful and somewhat disappointing, inspiritional and defeating, popular and esoteric, efficient and chaotic, essential and a luxury, worth the money and beyond our means."

L'Henry-Evans, Odette. "Case Study of a Pioneer Scheme For Teleconferencing in London: Open University Course: Faculty of Arts; The Age of Revolutions." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author explains an experiment in teaching through teleconferencing at the Open University in London. The course (The Age of Revolutions) as used in the article, leads the author to certain conclusions, among them that "Non-visual communication systems . . . have certain recognized instructional advantages over other media; there are factors which make telephone group discussion especially satisfying; and the psychological inhibitions normally resulting from non-visual communications were markedly absent . . . "

Lutze, Ruth. "Inactive Nurses Keep Up With Party Li Classes." The Capital Times, Madison, Wisconsin 20 April 1974, p. 9.

The article deals with how the Educational Telephone Network (ETN) is serving Wisconsin's Inactive Nurses to keep them aware of the latest trends in health care.

McKenna, Constance and Wiese, Alice. "Home Economic and TeleNet: Yesterday, Today and Tomorrow." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

Home Economics Extension programs, via the Illinois TeleNet System, present diverse subject of interest to family members both at home and i community settings. The article describes past and present status of TeleNet and potential uses for tomorrow.

Meyer, Thomas. "Communications in Postgraduate Medical Education." The Alabama Journal of Medical Science, 7 (2), April 1970, pp. 212-16.

A consequence of the knowledge explosion in the medical sciences is that health care professionals are pressed for time to keep up with developments in their fields. To deal with this problem, the Department of Postgraduate Educatio of the University of Wisconsin has experimented with three methods of making current pertinent a authoritative information readily available to health care personnel. A dial-access telephone library contains several hundred tapes with information which is relevant to emergencies, to new discoveries, or which is hard to find elsewhere. Single concept medical films are offered to hospitals throughout the state, for viewing b staff. Finally, telephone/radio conferences bri lectures and discussions to participating hospitals. All three methods have been widely utiliz by professionals in Wisconsin.

Meyer, Thomas C. et al. "An Experiment in the Use of Telelectures for Continuing Education of Physici and Allied Health Personnel." Medical Biologica Illustration, 18 (1), Jan. 1968, pp. 18-20.

This report tells of the early (1968) use of telephone conference lectures as a means of continuing education for all the health professions

Meyer, Thomas C. et al. "Report of an Experiment in the Use of Telelectures for the Continuing Educa tion of Physicians and Allied Health Personnel," The Journal of Medical Education, 43 (1), Jan. 1968, pp. 73-77.

The use of telephone conference lectures as a means of continuing education for all the health professions is described. The project proved to be highly popular with physicians and paramedica personnel in community hospitals throughout Wisconsin. The educational effectiveness of such instruction has not been fully evaluated, but on the basis of pre- and post-course examinations i has been concluded that the system shows promise

Nelson, C. L. and Klavon, A. J. "Extend Your School to the Community and the University." The Agricultural Education Magazine, 1974, p. 80.

The article describes the author's experience with "extending" the University of Maryland by phone. Experience both with the University and Easton High School, on the eastern shore of Maryland, illustrated that use of conference phones has great potential at the University level as well as the local school level.

Parker, Lorne A. "New Media for Police Education." The Wisconsin Sheriff and Deputy, 20 (2), Dec. 1968.

The author discusses the history and development of the Educational Telephone Network (ETN) and the Subsidiary Communications Authorization (SCA) of the University of Wisconsin. The author also tells of some of the educational uses to which these systems have been put and speculates on the future uses of ETN-SCA.

Paul, Aldrich K. "A New Concept in Sharing Speech Professors." The Speech Teacher, 13/14, Jan. 1965.

This essay focuses on the concept of multiplex transmitting. Multiple transmitting, used intermittently since 1899 with limited success, is now being used by educators with good results. The author discusses some of the methods used by telelecturing participants and lecturers to overcome what he calls an "audience adaptation factor." He concludes by citing and elaborating on four unique advantages of the telelecture technique: cost, availability, flexibility and ease.

Raccoli, Susan. "Technology Makes the Workshop Scene." Clavier, March 1974, pp. 31-3.

The author explains how the technology of the Educational Telephone Network has benefited people in Wisconsin with improved efficiency for greater numbers of people without loss of individual contact. Reactions to a Piano Teachers Forum were detailed, and a personal poll taken by the author revealed that the participants were generally enthusiastic about the course and the possibilities ETN presented for continuing education is music. In addition, the program was inexpensive, the course reached a large audience, and the program provided an opportunity for people living outside a metropolitan area to participate in an exciting continuing education program to their field of interest.

Ristau, Robert A. "An Evaluation of the Educational Telephone Network (ETN) as an Instructional Delivery System for a Graduate Course in Career Education." Report of the Center for Studies in Vocational and Technical Education, University of Wisconsin-Extension, Madison, 1 March 1973.

This report describes a program which enrolled 164 teachers, administrators and counselors from Wisconsin schools for a University of Wisconsin graduate extension course. Professional advancement and assistance in developing career educational programs were the primary objectives of most of the enrollees. During the fall semester, the course was taught using the Educational Telephone Network (ETN) statewide facilities with interface sessions which brought several local ETN groups together for the ETN presentation and discussion. In rating the course, nearly half the students evaluated it as equal to or better than the traditionally taught extension courses.

Rubin, Harold. "Telephone Network Courses." Educational Screen and Audiovisual Guide, 43, March 1964.

The author describes the various classes offered via amplified telephone at Stephens College, Columbia, Missouri, since its inception in 1958. The response to the telephone lectures was enthusiastic, and in tabulating the data from experimental telephone lecture classes against control classes (covering the same studies but without the off-campus speakers), some definite results emerged favoring continued telephone lectures.

Ruffing, Charles. "Michigan Education: Leader in Applying Telecommunication Theory." Michigan Challenge, November/Dec. 1975.

The State Board of Education of Michigan has backed the concept of educational telecommunications, and has funded several experimental projects in local school districts. One technique under examination involves the "subcarrier" of an FM radio station's broadcasting signal. In other school districts people are operating video-phone networks. The article devotes a paragraph or two to each of the projects taking place in Michigan using these two techniques.

Schwartz, Raymond and McNeely, Richard. "Telelecture: An Adventure in Learning," The Clearing House, Dec. 1971.

Through the use of the Bell Telephone Telelecture, the students at Dover High School, New Jersey, have been using the telephone to speak with leading political figures about their "points of view." Both students and teachers found the Dover telelecture program to be worthwhile: students felt it changed their attitudes about government, teachers believed that it was an effective way to make social studies "more realistic."

Sparks, James. "Helping Clergy Use Conflict Creatively." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976. (Reprinted from Adult Leadership, 24, 6, Feb. 1976.)

The author describes how the University of Wisconsin-Extension addressed the immediate needs of clergy via ETN. (The "immediate needs of clergy," according to the Midwest Career Development Center, Columbus, Ohio, are role confusion, a feeling of isolation, financial compensation, a lack of goal-directedness, the role of spouse in career satisfaction.)

"Spreading the Word on the New Math." Business Week, 10 April 1965.

Through a new combination of communication tools--telephone lines and the Electrowriter--, experts in modern math have been lecturing from Chicago, Cedar Falls, Iowa and Urbana, Illinois, to 2,250 Iowa parents and elementary school teachers as far away as 500 miles. Financed by a Ford Foundation Grant, local and state education grants and the federal government, the program is officially known as the Northwest Iowa Telewriter Project. The cost of the project was one of its largest advantages: one-thirtieth that of closed circuit television broadcasts of a similar nature. Iowa educators also cite the instructional benefits of the method.

Swan, Sam. "The Educational Telephone System in Missouri: A Case Study." The Status of the Telephone in Education, University of Wisconsin-Extension, May 1976.

The author cites an effective example of the use of the educational telephone system at the University of Missouri-Columbia. The program is offered by the Extension Faculty of the Department of Agricultural Economics. The article includes personal observations of those who have used the system.

Villardier, Louis. "Telefun at the Universite du Quebec: (2) Telelogo." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

A technically straightforward but pedagogically innovative course is described. Telephone lines are used to enable teachers around Quebec Province to take a computing course based on the LOGO language. Importance is attached to a communication system which enables students to send messages to the operator-facilitator and also to swap programs and ideas with classmates in other towns.

Witt, William. "Busy Medics Keep Pace: Doctors Go to School by Phone." Wisconsin State Journal, 21 March 1966.

The centralized telephone lecture allows doctors to fulfill moral responsibilities to patients while keeping up with current events in medicine. Programs are conducted for an hour and emanate from the studios at the state radio station, WHA, on the University campus. Physicians pay $50 for a series of two dozen lectures. The article lists other programs which currently utilize new communication technology to provide medical information to Wisconsin doctors. The author concludes with mention of programs being planned.

Instructional Design

Arndt, Jack. "Pharmacy Telelectures: An Analysis of Eight Years' Experience in Wisconsin." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The use of Wisconsin's Educational Telephone Network (ETN) for providing continuing education for health professionals in general and pharmacists in particular is described. Nine courses presented in the past eight years by Extension Services in Pharmacy are analyzed with respect to enrollment fluctuations, to professional specialities of the enrollees, and to attendance patterns of the participants.

Baird, Marcia. "Designing Teleconference Programs: Some Clues from the Wisconsin Experience." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The article illustrates how University of Wisconsin's faculty, using ETN (Educational Telephone Network) systems, have put implications of adult learning research into statewide classroom practice. The author focuses on general guidelines or "ideas to think with" that seem paramount to teleconferencing program design. The focus of the article then shifts to how programmers operationalize those "ideas" into specific techniques for program organizers, formats, discussion and feedback.

Beavers, April. "A Case Study of Organizing for a Telelecture Course or What to do Before the Phone Rings." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

This case study presents the preplanning activities and organizing procedures utilized in the implementation of a state-wide telelecture network in West Virginia (Project for Parents Understanding Student Handicaps-Outreach).

Dotterweich, W. W. "Enhancing the Effectiveness of Remote Teaching." Audiovisual Instruction, Feb. 1971, pp. 39-41.

The author's experience with remote teaching during the 1969-70 academic year at The University of Tennessee was useful in identifying problem areas and in directing his thinking toward improvements in preparation and presentation. Some observations are presented here in the hope that they might be helpful in enhancing the effectiveness of the remote teaching process and in overcoming reluctance to teach such classes. The advantages and disadvantages of remote teaching by videotape are treated first, and then the supplemental use of the Electrowriter is discussed as a means of overcoming some of the fundamental deficiencies of this technique.

Glueck, William F. "Management Training Using Telelectures." Training and Development Journal, 25 (11), Nov. 1971.

After participating in a telelecture program on management training for hospital administrators and middle managers, the author concluded that telelectures have advantages in training individuals at multiple sites simultaneously and, in some cases, economically. In this article, the author discusses what telelecturers are, the content and methods used, the difficulties and advantages of the method and some possible uses in other organizations.

Hartje, George N. "Utilizing Telelecture in Teaching." International Journal of Instructional Media, 1 (3), Spring 1974.

This paper describes the steps involved in the use of telelecture for a unit of a graduate course on the academic library. The paper enumerates the necessary techniques, indicates the relationship of telelecture to media technology and learning, and gives a brief resume of telelecture in college teaching. It was learned that careful preparation is necessary in using telelecture for a successful learning environment.

Heiliger, Edward M. "Teaching Information Retrieval Using Telediscussion Technique." Center for Library Studies, Kent State University, Ohio, 1972.

This paper concerns an experiment in teaching a graduate seminar on Information Retrieval using telediscussion techniques. Outstanding persons from Project INTREX, MEDLARS, Chemical Abstracts, the University of Georgia, the SUNY biomedical Network, AEC, NASA and DDC gave hour-long telelectures. A Conference Telephone Set was used with success. Student diaries and an observer provided part of the background material for this paper. Recommendations are given for future course design.

Hugdahl, Edward O. "A Communications System Serving the Continuing Education Needs of the Piano Teacher." The American Music Teacher, Feb./March 1976.

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In 1973 came the idea of using a communications system, Wisconsin's Educational Telephone Network (ETN), to provide a state-wide two-way communications system in music. Never before had music been programmed on ETN. The experimental program, the Piano Teachers Forum, was set up and was successful, for the ETN system eliminated location and travel schedules and opened up possibilities for drawing upon teaching and performing talent. The author briefly explains how the ETN system works and discusses how a few of the musicians have adjusted to broadcasting on this unique system. He concludes the article by listing the stages he feels are necessary to most effectively utilize this communications system.

Hugdahl, Edward. "Utilizing Teleconferencing for Music Education." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976

By utilizing a communications system like the University of Wisconsin-Extension Educational Telephone Network (ETN) music education can venture into new frontiers of programming which have tremendous potential. Adult and extension music education can now have a statewide impact which the traditional and conventional forms of delivery, such as local, regional, and state workshops and classes, can never achieve. Further, such a communications system makes it possible to achieve programming involving internationally celebrated artists and universally acclaimed authorities which can be afforded in no other way.

Krietlow, Burton W. "Tuskegee, Are You on the Line?" Adult Leadership, Nov. 1974, pp. 133-4.

The author opens with a brief explanation of how the Educational Telephone Network functions. The main concern of the author is with the teaching problems he experienced with the ETN system, and he gives a seven-item list of suggestions for making teaching on the network productive. Selected 1972 and 1974 class responses were given to illustrate the positive change in student reaction to classes on ETN that has occurred.

Lemberger, Max, Balanoff, Neal and Siegel, Betty. "Educational Telephone Network: English Faculty and Foreign Population." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The authors describe the development of a course for foreign pharmacy graduates through ETN. They conclude: "It is possible now to educate a large number of students in a language that the instructor cannot speak. This opens the way to education for many national groups in the United States who are unable to practice their profession because of licensing restrictions."

L'Henry-Evans, Odette. "Teaching by Telephone: Some Practical Observations." Paper presented at the conference on teaching by telephone held by the Open University, Westfield College, London University, April 1974.

Most Open University tutors are used to giving tutorial help to individuals by telephone. Recently, a number of experiments have been set up to link more than two individuals at a time. One of the methods is a 'conference call' where up to 8 people can share in a conversation from their own homes. Dr. Odette L'Henry-Evans is a Senior Lecturer in French Language and Literature at the Polytechnic of North London, and a part-time Open University tutor is arts. She writes from her experience of running telephone tutorials.

McKay, Gerald R. "Teleteaching-The Party Line Revived." Audiovisual Instruction, May 1971. [Also: Extension Service, Review, 41 (11), Nov. 1970.]

Minnesota used telelecture for 59 meetings, reaching 296 groups in 35 counties. The experience showed that this type of meeting can be successful, but that the person in charge of each group must have careful training on the receiving equipment. They found it important that the speaker carefully adapt his message to his particular audience. In most cases no speaker talked longer than 20 minutes without a break for questions or local discussions within the groups. In all but one meeting visuals were prepared for each speaker and sent to the group ahead of time.

Meyer, Thomas C. "The Role of Telephone Technology in the Continuing Education of Health Professionals." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

Ten years' experience in utilization of instructional technology in continuing education programming at the University of Wisconsin is reported. Specific media and methodology used include telephone conference, dial access library, and slow scan television, with attempts at evaluation of each described. The experience indicates that more attention must be given to identification of educational needs, deficiencies in medical school training programs, and evaluation of end results before optimum use of educational technology in continuing education is possible.

Miller, LaVerne. "Teaching with the Telephone--A Classroom Instructional Tool in a Community College." The Status of the Telephone in Education, University of Wisconsin-Extension, May 1976.

Professor Miller discusses the elements involved in structuring a telelecture course, a kind of how-to-do-it approach, by describing a methodology "which seemed to work." She concludes that the most important lesson the telephone lecture taught her is that the "medium must be integrated into instruction in such a way that it is either the warp or woof of the learning action, whether it is television, films or the telephone." She also supplies a list of "Some Telelecture Guests."

Monson, Mavis. "A Report Investigating Teaching Techniques Used Over the Educational Telephone Network, University of Wisconsin-Extension." A Design for Interactive Audio. University of Wisconsin-Extension, Madison, 1977.

This report represents a study of teaching techniques with respect to a telephone-based instructional system--the Educational Telephone Network of the University of Wisconsin (ETN). Field research was used to gather basic data on the techniques being used. The author attempts to determine common characteristics of the approaches used by various instructors in their planning for ETN programs. Theories of communications, learning and adult education were surveyed and any informal correlations between actual practice and accepted theory are noted. Some general guidelines with respect to planning for ETN programming are summarized.

Monts, Elizabeth, A. and Peterson, Bernadine H. "Graduate Teaching by Telephone and Radio."

Journal of Home Economics, 61 (6), June 1969.

A graduate course in home economics education was taught by means of telephone and radio to a group of home economics teachers meeting at an off-campus center. A control class met on campus with the instructors present. The study sought to answer the question: Is it possible to present a graduate course effectively without the presence of the instructor in the classroom? Overall evaluation of the course by students in both groups indicated a positive point of view. Mechanical aspects were a problem for students, especially those in the experimental group who also continued to miss the physical presence of the instructor. Their pilot study offers findings and recommendations useful in developing off-campus offerings by means of educational technology.

Parker, Lorne A. "Effective Teaching Techniques for Educational Telephone Network Instruction." Paper presented at demonstration workshop, Fort Gordon, Virginia, April/May 1975.

The author briefly covers the development of ETN, explains the use of the station equipment, and discusses the cost of the educational telephone network. The major thrust of the article is to discuss some of the effective teaching techniques that are built into the design of instructional programs transmitted via the telephone system. Research on teaching via telephone is given, and the author gives some suggestions for effective usage of the telephone in education. This report also includes evaluation highlights and summary of an ETN experiment with the Army.

Parker, Lorne A. and Baird, Marcia A. "Humanizing Telephone Based Instructional Programs." Departmental Publication, University of Wisconsin-Extension, Madison, Nov. 1975.

In this paper, the authors focus on some of the personalizing, discussion and teaching techniques that are built into the design of long distance Educational Telephone Network programs. The paper includes a brief explanation and description of Wisconsin's Educational Telephone Network.

Paulson, Robert L. "Tel-A-Lecture Technique." Educational Screen and Audiovisual Guide, 42, June 1963.

The article describes how the members of the Iowa Audio-Visual Association were introduced to a new instructional technique. Educators at the Malcolm Price Laboratory School, State College of Iowa, Cedar Falls, were shown how it was possible to adapt audiovisual techniques to a conference problem. The article also discusses the ongoing projects at the school concerning telephone amplification for classroom instruction. It concludes with principles learned from the project which the authors feel seem to be evident and which can help other educators concerned with implementing telephone-based equipment into their curriculum.

Schrieber, David. "Improving Communication Effectiveness Over ETN." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

This paper examines the concept of communication within the context of the Educational Telephone Network and discusses why sometimes communication does not take place, and what can be done to improve the odds of effective communication when using ETN media. The primary objective of the paper are directed at helping "educators or communicators become aware of some of the pitfalls in communication via ETN and to become interested in some of the possible actions which can be taken to avoid or overcome these pitfalls . . . and to encourage educators to experiment a bit with some of these concepts next time they venture into the world of ETN."

"Suggestions for Effective Tele-Lecture Presentations American Telephone and Telegraph and Associated Companies, Morristown, N.J., April 1968.

This brief handbook presents some helpful hints to telelecturers, particularly those persons participating in the amplified telephone conversation for the first time, so that they may feel confident and effective in the telelecture situation. Suggestions are also made for those persons responsible for setting up the telelecture and for those who may serve as conference moderators.

Tucker, Thomas T., et al. "Seminar by Amplified Telephone: A Report and Evaluation." Nevada Western States Small Schools Project, Nevada University, Reno, 1968.

A pilot program is outlined which explored one possible way by which teachers in small schools might have access to quality in-service education. The use of the amplified telephone and the conference bridge technique is described. A general description of the course (a cooperative effort of the Western States Small Schools Project and the University of Nevada) is presented, including content, requirements, and method. An evaluation of the course considers content, method of presentation, on-site situations and participant comments. Conclusions and recommendations for improving the program complete the document.

Wakefield, Lucille M. and Vaden, Allene G. "Nutrition Course for Elementary Teachers by Telephone (Telenet)." Journal of Nutritional Education, 5 (3), July-Sept. 1973.

Telenet was used in Kansas to respond to the challenge of the White House Conference on Food, Nutrition and Health to upgrade nutrition education knowledge of teachers. As an outgrowth of this course, a nutrition education course for elementary teachers has been added to the curriculum of a four-year, teacher training, denominational college in Kansas. In addition Kansas State University, Department of Foods and Nutrition, and Dairy Council, Inc., of Greater Kansas City sponsored a college credit nutrition education course for teachers in Title I Schools in Topeka, Kansas.

Walsh, L., et al. "SCA and ETN Procedures and Guide lines for Use by University Extension Specialist in Projects III, IV and VII." A Preliminary Report to the Extension Projects III and IV Advisory Committee, University of Wisconsin-Extension, Madison, Feb. 1968.

The purpose of the report is to give guidelines and suggestions for the new media--Educational Telephone Network (ETN) and Subsidiary Communications Authorization (SCA). The paper explains how the systems work, identifies their communication characteristics, and explores the potential of the ETN-SCA systems. Examples are given as to how to develop, prepare and deliver presentations for ETN-SCA.

Wentorf, Dorothy, "Report on Organization Theory Course, 1974-75." Given in Conference and Phone Seminar Format, University of Wisconsin-Extension, Madison, 4 Nov. 1975.

The Organization Theory course was presented through a combination of conference telephone and Saturday seminars. The survey which formed the basis of the evaluation was returned by a total of 110 students at the close of each semester, 55 each time. This represents about 70% of the students who enrolled in the course and a higher percentage of those who actually finished the course. The report opens with conclusions based on results from student evaluations and on recommendations made by instructors. The methodology of the evaluation method was given and significant specific course features were detailed. The results indicated that learning does take place. However, there is a substantial resistance to this kind of instruction both on the part of the instructors and students.

Wentorf, Dorothy and Adams, W. Sam. "Mediated Graduate Instruction--Does It Work?" Unpublished Manuscript, Aug. 1973.

Offering a Management Foundations course over Wisconsin's Statewide Extension Education Network (SEEN) provided an opportunity to test a relatively new media technique. The report seeks to answer how useful this technique is in delivering a course of this type to students geographically scattered throughout the state of Wisconsin, to participants who are diverse in age, years of business experience, and educational background. In addition it attempts to find what factors, if any, relating to the equipment, facilities, or instructional techniques appeared to be important to their academic performance or reactions to the course. Lastly, the report offers recommendations to be used for future programming.

Research

Bailey, G. C., Nordlie, P. G. and Sistrunk, F. Teleconferencing: Literature Review, Field Studies, and Working Papers. Institute of Defense Analysis, Research and Engineering Support Division, Human Sciences Research Inc., Oct. 1963--Revised March 1966.

The purposes of this report, based on a three-month study, are to (1) identify propositions from past research which have potential applications for teleconferencing procedures and facilities; (2) identify social and psychological variables which need to be taken into account in the evaluation of teleconferencing; (3) suggest alternative arrangements; (4) formulate hypotheses from the information collected about relationships among variables in the teleconferencing situation; (5) identify and describe a rationale for criterion variables which might be used in experimental studies. It is the general objective of this study to assemble and review information relevant to teleconferences and teleconference research and to draw implications therefrom for the long range teleconference research program. This report is an overview of the results of the three-month study. It is supplemented by a series of Working Papers which contain greater technical detail on various special topics.

Blackwood, Helen and Trent, Curtis. "A Comparison of the Effectiveness of Face-to-Face and Remote Teaching in Communicating Educational Information to Adults." Cooperative Extension Service, Kansas State University, Manhattan, Oct. 1968.

Blackwood and Trent evaluated 71 students divided into two groups by means of random sampling. Pre-tests and post-tests were given simultaneously to two groups--the 34 control students who were taught in the traditional method, and the 37 students who were instructed by telephone. Results showed no differences in the amount of learning between the two groups and no differences depending on varying educational levels among the students. Attitudes for both groups were similar but they did observe students aged 35-44 were more positive to remote teaching, while those 45-64 liked face-to-face instruction better.

Boswell, John J. and Mocker, Donald W. "Remote Teaching at the University of Missouri, St. Louis." Unpublished Manuscript, University of Missouri-St. Louis.

This paper explains how educational telephone and Electrowriter systems work and tells of a research project conducted at the University of Missouri, St. Louis. The study was designed to determine the effect of the hardware on a simultaneous class and to determine the efficacy of the technique for remote teaching. Three groups of students were involved: the first was a control group which received a traditional lecture; the second group, also in St. Louis, was a control group which received a live lecture which was simultaneously transmitted to a third group in Flat River, Missouri. The results showed no difference among pre-test scores, post-test scores or behavioral observation data. The students' response to the teacher-class evaluation forms also failed to show systematic differences among the groups.

Boswell, J. J., Mocker D. W. and Hamlin, W. C. "Telelecture: An Experiment in Remote Teaching." Adult Leadership, 16 (9), March 1968, pp. 321-2, 328.

The paper is concerned with the question of whether or not remote teaching can produce results comparable with those observed on the home campus following traditional lecture methods Three classes of introductory psychology were involved. One group was a control group (n=64) which received a traditional lecture on the home campus. The second group (n=63), also on the home campus, received a live lecture which was simultaneously transmitted to a third group (n=22 located in a remote classroom. The results of th pre-test and the post-test showed no differences among the groups.

Boyd, Gary. "Game-Plans and Reward Structures for Teleconferencing." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author offers a theoretical treatise of the underlying psychological and sociological interactions of teleconferencing. The hypothesis is related in terms of game theory.

Brendel, Philip J. Incasting and the Telephone Network. Center for Policy Research, Inc. New York, Jan. 1972.

Incasting is the inward flow of information from many participants to a central destination. This paper describes the nature of incasting and

to what extent it may be executed by using the telephone system. A new incasting network is proposed which is superimposed over the existing telephone network, and it is shown how the two networks augment each other.

Burkhart, James A. An Experiment to Determine the Values of Using Amplified Classroom Telephone Interviews with Significant Individuals to Enrich Certain College Courses. Stephens College, Columbia, Missouri, 1960.

An office telephone with an attached amplification unit and an auxiliary microphone telephone were used in four different college courses for regularly scheduled interviews with prominent individuals. A one-year experiment utilized an experimental section and a control section for courses in American Government. Modern Business, Philosophy and World Literature. Experimental sections were taught by regular methods,but with the addition of a telephone interview which was either 1) student-centered with a short instructor "warm-up" for the interview, or 2) teacher-centered with student questions following a 20- or 30-minute instructor interrogation during the interview. Pre- and Post-tests consisted of an inventory of beliefs and a knowledge test. In the one course in which complete testing was accomplished, the experimental group made significantly higher scores than the control group.

Casey, Anna E. and Havron, M. Dean. "Human Needs In Teleconferencing." Audio-Visual Communications, April 1974.

Human Sciences Research has conducted studies on teleconferencing for the Canadian Department of Communications. Users of two audio and two audio-video teleconference systems were interviewed and systems were observed and described. Results, while preliminary, suggest that: 1) Teleconferencing can play an important role in government and business communications. 2) Engineering of satisfactory teleconference systems is--for the most part--well within the state of the art. 3) Organizational, social and personnel factors are quite important to the efficiency and continued use of teleconference systems. This paper describes constructs needed to understand "people variables" involved in teleconferencing, and how they influence system performance and user satisfaction.

Casey-Stahmer, Anna E. and Havron, M. Dean. Planning Research in Teleconference Systems. Human Sciences Research, Inc., McLean, 28, Sept. 1973.

The study represents a joint effort by the Human Sciences Research of McLean, Virginia and scientists of the Social Policy and Programs Branch of the Department of Communication. Its primary purpose is to establish a rationale and guidelines for determination of research priorities in teleconferencing. Data were obtained by developing a grid or map or organize teleconference system dimensions and attributes as seen by users, and by interviews with users of four teleconference systems. The authors suggest that 1) Variables associated with interaction between terminals are more important to users than static factors. 2) Audio-Video systems are only moderately or marginally superior to audio systems that include telegraphics (this depends in part on conference tasks). 3) Variables of the personnel or subsystem are extremely important; they determine in large part whether systems work and whether they continue to be used. The authors also give their suggestions as to what areas need research attention.

Champness, Brian G. "Attitudes Towards Person-Person Communication Media." Human Factors, 15 (5), Oct. 1973, pp. 437-47.

Several recent experiments in fields such as bargaining, opinion change, and problem solving have employed the medium of communication as an independent variable. This study was designed to investigate attitudes toward three media: face-to-face, loudspeaking audio and closed-circuit television. Thirty-six pairs of managerial civil servants engaged in three six-minute discussions, one via each medium, in a competely controlled design. After each discussion, subjects completed a 24-scale, semantic differential, media-attitude questionnaire. There were significant effects of the media upon 20 or the 24 scales.

Champness, Brian. The Perceived Adequacy of Four Communication Systems for a Variety of Tasks. Communications Studies Group, Joint Unit for Planning Research, University College London, Nov. 1972.

The aim of the experiment was to test a questionnaire which was designed to measure the extent to which users perceive a system to be satisfactory for a variety of purposes. This instrument measured cognitive, rather than affective components of attitudes. One hundred and twelve managers on a Civil Service training course conversed in pairs over one of four communications media: face-to-face, loudspeaking audio and two closed-circuit television systems. There were statistically significant differences for media on 15 of the 19 scales. Factor analysis of scale scores produced four factors: interpersonal relations, factual information, conflict and general discussion. In general , only face-to-face was satisfactory for interpersonal relations and all media were satisfactory for factual information, while video systems and face-to-face were believed to be satisfactory for conflict.

Chan, Paulina. "A Model of Some Psychological Factors in Teleconferencing, Including Social Relationships, Participant-Satisfactions and Group Performance." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

This paper is concerned with ways of analyzing group behavior and interaction patterns in teleconferencing. Its features can be interpreted in terms of an Equilibrium Model which consists of two interacting sybsystems: The Conference Activities Inventory (CAI) and the Users' Behavioural Needs (UBN).

Chan, Sui-Wah and Messick, Jim. "Telecommunications Projects in Medical Education and Health Care." Unpublished manuscript representing an introduction to a more extensive report, Office of Medical Education, Research and Development, Michigan State University, East Lansing, Nov. 1974.

This paper is an attempt to survey projects which have utilized or plan to utilize interactive (two-way) communication technologies to assist in solving problems commonly referred to as the shortage and maldistribution of physicians and health care services. The paper gives a listing of the projects, followed by one paragraph descriptions of each project. The paper represents condensed and greatly capsulized information which serves only as an introduction to a larger survey

which will be made available for distribution from Michigan State University's Office of Medical Education, Research and Development.

Christie, Bruce. An Evaluation of the Audio-Video Conference System Installed in the Department of the Environment. Communications Studies Group, Joint Unit for Planning Research, University College London, Nov. 1973

A two-way audio-video system was installed and operated between two parts of the Department of the Environment for approximately one year. During that time it was used by only two groups, one of which only used it once. The present report examines why it was not used more. Several factors are isolated which appear to have worked against the use of the system. Of these poor publicity and the convenience of travel seem to have been the two major factors. However, careful examination of the interview and questionnaire data available suggests that the usefulness of the system would have been limited in any case to audio-oriented, symmetrical, non person-oriented groups in which the members were well acquainted with each other. In this light, it is difficult to justify the use of a visual channel, especially over short distances. The real need seems to be for a conference system with a high quality audio component and a facility for the rapid transmission of graphics and text.

Christie, Bruce. Teleconferencing: Predicting the Level of Use. Communications Studies Group, Joint Unit for Planning Research, University College London, Dec. 1974.

A program of experiments has been initiated to examine the contextual factors which influence the choice of communication mode. Results so far support hypotheses developed in the field that the degree of acquaintance of the participants, the content of the discussion, and the convenience of the travel alternative, all affect the individual's decision. His attitude towards the teleconference system is also important, and may be more important than the nature of the system itself. It is also clear that these factors interact with each other.

Christie, Bruce. Travel or Telecommunicate? Some Factors Affecting The Choice. Communications Studies Group, Nordic Working Party on Conference Telephony, 1975.

Forty-eight senior civil servants used either a two-way television or two-way audio-only teleconference system to hold a simulated business discussion. Following this experience, each subject then decided whether he would 'travel' or 'telecommunicate' in each of the 16 cases. The subjects who had experienced the television system were significantly more likely to choose in favor of telecommunication than those who had experienced the audfo-only system. The number of strangers involved in the discussion, and the cost of teleconferencing, each had a significant effect for both types of system equally. The time involved in meeting face-to-face, and the content of the discussion, each had a significant effect only for the television system. The confidentiality of the material discussed did not have a significant effect, but this was probably due to the instructions given the subjects. The results are discussed and interpreted.

Cook, Thomas G. "Tel-Lecture." Adult Leadership, May 1963.

The author writes of a May 3, 1962, telelecture presented at La Crosse State College by Dr. Max W. Carbon, Professor of Mechanical Engineering at the University of Wisconsin. His topic: "The Nuclear Reactor; Its Function and Purpose." An evaluation of the course indicated that the audience had little difficulty hearing and seeing the entire program. All respondents felt the telelecture to be either a "Very Effective" or "Effective" method of teaching and learning. Sixty-six percent of the respondents felt it was "As Effective" as a lecture "in person," 25% felt it to be "Less Effective." The author felt this might be attributed to the newness of the technique. The author concludes the article with six guidelines for planning future telelectures.

David, Austin, F. S. C. "ITV, Telephone, and Computer as Instructional System-A Feasibility Study," AV Communication Review, 21 (4), Winter 1973.

In 1966, the Catholic Schools in the Diocese of Brooklyn, with technical assistance from IBM, began experimenting with the use of computer controlled voice-response units for educational purposes. The objective of the research was to link ITV, the telephone and the computer into a unified system of instruction. The author concludes that the three were successfully linked to provide an interactive retrieval system useful in the instructional process. The technological feasibility of using an ordinary telephone to control a computer and ITV broadcast was clearly demonstrated, although the costs for this prototype system would have to be greatly reduced before such a system would be economically feasible.

Dilley, J., Lee, J. L. and Verrill, E. L. "Is Empathy Ear-to-Ear or Face-to-Face?" Personnel and Guidance Journal, 50 (3), Nov. 1971.

If counselor and counselee cannot see each other, is the quality of their relationship affected? This study compares the empathy ratings of trained and untrained counselors in three different situations: counseling by telephone, in a confessional-type arrangements and face-to-face. Although trained counselors scored significantly higher empathic understanding ratings than untrained counselors, there was little difference among the ratings for the three methods used.

Edelman, Lily. "Teaching Adults via Tele-Lecture and Electrowriter (Victor Electronic Remote Blackboard)." Commission on Adult Jewish Education, B'nai B'rith, Washington, D. C., May 1967.

This project tested whether the telelecture and Electrowriter could (1) Be used effectively for the simultaneous instruction of adults in multiple remote areas, and (2) Used by a master teacher to provide learning experience for adults which is at least as effective as face-to-face instruction. The 'Master' teacher in Chicago taught Hebrew simultaneously to telelecture groups in Grand Rapids and East Lansing, Michigan, and to the 'live' control group in Chicago for nine sessions of one hour each. Each of the experimental classes was originally made up of a minimum of 20 students who had no prior knowledge of how to read or write Hebrew. A similar control group originally had 40 students. An analysis of

scores on a midterm and a final examination, and on an oral reading test indicated no significant differences between performances of the three groups. The presence or absence of the instructor from the classroom did not affect the performance on any of the criteria.

Ewbank, H. L., and Baker, E. E. "Tele-Lecture or Traditional Lecture?" Journal of Cooperative Extension, Spring 1968, pp. 46-51.

In an attempt to minimize travel and make the best use of time, some extension personnel have tried telelecture, a technique which brings the speaker to the audience via an amplified telephone call. But how does an audience react to such a lecture as compared to one delivered in person? Will a traditional-lecture audience be able to recall more information than will one exposed to information by remote control? To answer these and other questions, a study was made of a telelecture audience as compared to a traditional-lecture audience. The authors present the conclusions and discuss the implications for adult educators.

Feravolo, Mary G. "Investigation of the Effects of the Telephone in Causing Positive or Negative Factors in the Study Habits of Female College Students in an Urban University." Journal of Educational Research, 57 (3), Nov. 1963, pp. 152-53.

The purpose of this survey was to determine whether or not the telephone causes positive or negative factors in the study habits of female college students in an urban university. An analysis was made of the amount of time female college students spent talking on the telephone through the school week (Monday through Friday). One of the main points of this survey was to determine how much time spent talking on the telephone was devoted to the discussion of class assignments and school work. After compiling statistics, and reporting statistics pictorially on a graph, the results showed roughly that approximately one-half of the time the subjects spent talking on the telephone was involved with the discussion of school work.

Flinck, Rune. "Teletutoring in Distance Education." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author describes a research project at the university of Lund in Sweden (Department of Education). The main aim of the project is to study the importance of two-way communication in distance education and how this two-way communication can be reinforced.

Gartrell, J. W. and Mendenhall, Nicole. Attitudes Towards Changes in Communications Technology: The Introduction of Teleconferencing. Communications Research Centre, Department of Communications, 1280, Ottawa, Oct. 1975.

A questionnaire survey was conducted in the regional offices of the Department of Communications in the summer of 1974 to determine the attitudes and perception of managers towards the installation and usage of an audio teleconferencing system. These data were compared with results obtained from a previous survey conducted at headquarters. The following results were obtained: 1) regional respondents indicated more positive attitudes towards the introduction of teleconferencing than headquarters respondents; 2) the perceived need and utility of teleconferencing facilities were higher in the regions than those reported by headquarters respondents; 3) respondents of both samples do not perceive the possible effects of this medium on communication behavior; 4) both samples indicated a need for audio-graphics or audio-visual facilities to conduct their meetings.

George, D. A., Coll, D. C., Paterson, S. A. and Guild, P. D. "Video Via the Telephone," supplement to The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

Three major applications of the telephone in the delivery of video in support of "teaching at a distance" are discussed in this paper: 1) the telephone as a support device providing interaction, or feedback, from student to lecturer; 2) using the telephone system itself to carry signals for graphic displays; 3) the possibility of compressed video signals being transmitted over systems with bandwidths much less than required by conventional television.

Griver, Jeanette A. and Robinson, Margot B. "Centralized Training for Personnel in Remote Locations." Human Factors, 11 (2), April 1969.

A training approach for off-site personnel was developed and tested. In an earlier study the approach had successfully reduced communication errors among purchasing agents in the procurement division of a major aerospace firm. The total approach to motivation, communication and learning devised at the main plant was modified and extended to improve job performance of personnel in remote locations. Its applications resulted in a level of learning comparable to that of the on-site personnel.

Holloway, Sue and Hammond, Sandy. "A Study of Users Reactions to Two Telephone Teaching Systems at the Open University." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The authors describe the background, the methods used and the results obtained from a pilot study by the Communications Study Group, University College, London, using two types of tutorials: the conference call (enabling students to attend a tutorial without leaving home) and the Loud-Speaking Telephone tutorial (LST-4, which enables the tutor to stay at home).

Holloway, Susan and Hammond, Sandy. Tutoring by Telephone: A Case Study in the Open University. Communications Studies Group, Joint Unit for Planning Research, University College London, Jan. 1975.

This report concentrates on a survey of user reactions to two group audio systems at present being used on an experimental basis by the Open University. The North London Telecommunications Project was set up in early 1973 to look into the feasibility of running tutorials over group telephone systems. The conference call facility, linking up to eight subscribers through their own telephone lines has been used for 'remote' tutorials, and at study centres the Loud Speaking Telephone (LST4) has been used to link groups of students with 'remote' tutors. A small sample of users of both systems were interviewed at length to find out reactions to the systems and to assess the potential usefulness of the systems.

Johansen, Robert. "Pitfalls in the Social Evaluation of Teleconferencing Media." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

"How will new media affect the way people communicate?" This is a long range question of social impact. The current state of social evaluation efforts is characterized by a lack of integrating theoretical perspectives. However, the growing number of evaluation efforts are at least serving the important function of highlighting potential pitfalls. These pitfalls suggest more sophisticated approaches soon to be developed. The author cites six pitfalls and draws several overall conclusions from an analysis of these pitfalls that serve as the basis for the future design of evaluations. He states that his conclusions are "suggestions" and are intended to encourage the development of more sophisticated approaches. They will need to be revised and expanded as the social effects of group communication through electronic media become more fully understood.

Jull, G. W., McCaughern, R. W., Zalatan, A. W., Tassie, A. W. and Storey, J. R. "Research Report on Teleconferencing." Unpublished manuscript, Research Sector, the Economic Policy and Statistics Branch and Government Telecommunications Agency, Toronto, Sept. 1975.

This report presents results, conclusions and recommendations arising from a three-year study of the potential of teleconferencing as a service to improve the effectiveness of communications within federal government departments. It has been found that teleconferencing is feasible and can be very useful as an aid to communications between decentralized units, but all available systems have major technical limitations.

Jull, G. W. and Mendenhall, N. M. "Prediction of the Acceptance and Use of New Interpersonal Telecommunications Services" supplement to The Status of Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The authors report on studies concerned with the acceptance and use of teleconferencing and its application to management and administration. Surveys of attitudes of users and laboratory studies were carried out. Results identified factors which have an important influence on acceptance and use of the Canadian Systems which include government, university and private sector applications. Factors identified include: organizational communications needs, attitudes towards teleconferencing systems, the convenience of the travel alternative, satisfactory technology and acquaintanceship.

King, Franklin J. "A Study to Ascertain the Feasibility of Incorporating Telelecture in Presenting a Teaching Methods Course." University of Missouri, Columbia, U. S. Department of Health, Education, and Welfare, Office of Education, Bureau of Research, Feb. 1971.

Three methods of teaching an in-service teacher education course, "Principles of Teaching Industrial Subjects," were compared for their influence on informational achievement, teaching performance, attitude toward the course, method of presentation and cost. Fifty-five vocational teachers were divided into three groups, each taught during a semester by one of the following methods: telelecture each week, alternate weeks of telelecture and traditional face-to-face lecture-discussion, or face-to-face lecture-duscussion each week. Analysis of pre- and post-tests showed no significant differences among the three groups in achievement, performance, or attitude. However, the telelecture is more economical in instructor costs and travel time and is recommended as a means of teaching professional extension courses. The post-tests--a midterm exam, final exam, and the rating scale used to evaluate video taped performance tests--are appended.

Kite, Richard W. and Vitz, Paul C. "Teleconferencing: Effects of Communication Medium, Network, and Distribution of Resources." Institute for Defense Analysis, Research and Engineering Support Division, March 1966.

This exploratory research focuses on the definition of problems that may be associated with the use of various communication media for teleconferencing. The first section describes an experimental task developed to elicit negotiating behavior. In Section II, the results of negotiations conducted over three different media are discussed. Section III presents the results of experiments in which the size of the negotiating group and the networks of communication were varied. Section IV is concerned with the question of how differences of economic power within an alliance affect the amount of conflict in negotiations over the allocation of economic resources, and Section V presents a summary and conclusions.

Knudsen, James G. and Stone, Solon A. "Use of Telelecture and Electrowriter Systems to Teach Engineering Courses." Oregon State University, Corvallis, July 1971.

A study was made to determine the feasibility of teaching a graduate course in engineering using the Electrowriter. In general, although off-campus students performed as well as on-campus students taking the same course, the students much preferred the face-to-face contact type of course. The material must be presented visually in a graduate course seemed to be too much for the Electrowriter to handle with ease. On the basis of students' comments, several suggestions were made for improving the remote courses.

Parker, Lorne A. "A Study Comparing the Effects of Compressed Speech Programs with that of Normal Speech Programs Transmitted Via the Educational Telephone Network (ETN) to Professional Adults Throughout the State of Wisconsin." Unpublished Doctoral Thesis, the University of Wisconsin, Madison, May 1972.

This study compares the effects of a compressed speech program transmitted via the Educational Telephone Network (ETN) System on various professional adult groups throughout Wisconsin with that of a program transmitted at normal speech. It is concerned with the noise source, receiver and destination aspects of the Shannon Weaver Communication Model. The relationship of compressed speech lectures transmitted via the ETN system are discussed using the Shannon-Weaver theory. A total of 206 students enrolled in two continuing educational programs are used. Each lecture was taped twice. The normal version of the tape was recorded at approximately 125 wpm, and the compressed version was recorded at 275 wpm. Conclusions are listed.

Pellet, Vernon, L. "The Comparative Effectiveness of the Educational Telephone Network and Face-to-Face

Lectures for University Extension In-Service Training." Unpublished Doctoral Thesis, the University of Wisconsin, 1970.

The author compared the effectiveness of lecture presentations through the use of the Educational Telephone Network (ETN) and face-to-face situations of conventional district in-service training meetings for county Extension agents and explored implications for the selection of in-service training media. Conclusions include the following: ETN can be an effective medium for communicating cognitive knowledge for Extension in-service training; improvements could be made in the operational procedures used and the quality of ETN transmissions; and the degree of open-mindedness does not appear to be a significant factor to consider in the selection of ETN for in-service training.

Peterson, Bernadine H. "Adult Education by Means of Telephone." Paper presented at the Adult Education Research Conference, Minneapolis, Minnesota, Feb. 1970.

Using a graduate credit and a noncredit home economics course, this study of the University Educational Telephone Network (ETN) investigated whether telephone instruction can be effective in adult education, and how adults would react to this medium of remote, off campus extension teaching. The graduate course was divided between an experimental group (telephone) and a control group (on campus, face-to-face instruction). The ETN noncredit seminar consisted of three two-hour sessions, one a week. Tentative evaluations concluded telephone instruction is useful for persons scattered over wide geographical areas, and its use should be further refined, expanded and evaluated.

Puzzuoli, David A. "A Study of Teaching University Extension Classes by Tele-lecture." West Virginia University, Morgantown, Aug. 1970.

After an overview of literature on tele-lecture models, a study was made of the applicability of teaching university extension courses by telelecture and Electrowriter. At West Virginia University, courses in mining engineering and in modern mathematics were given to college classes (control group) and also, using telelecture and Electrowriter, to Extension classes in Beckley, 265 miles distant (experimental group). Comparative analysis of the achievement of the two groups, using the T-Test and F Ratio, showed that achievement by the Extension classes was equal to, or significantly greater than, that of students in the on-campus classes.

Reid, A. A. L. "Channel Versus System Innovation in Person/Person Telecommunications." Human Factors, 15 (5), 1973, pp. 449-57.

Eight system charactertistics of a telecommunications device are identified and discussed: they include penetration, cost, access, search, attitude, ancillary, storage and coordination characteristics. The author argues that improvement in each of these would produce real benefits in terms of increased communication effectiveness. If proposals for channel innovation (such as the introduction of videotelephone) are to be justified, it is necessary to demonstrate that they would yield coorespondingly valuable benefits.

Reid, Alex. "New Directions in Telecommunications Research." Report of the Sloan Commission on Cable Communications, Alfred P. Sloan Foundation, New York, June 1971.

Telecommunications research has been focused mainly on technology. Now research about the human factors is crucial. This can be divided into four areas. (1) The needs telecommunications must satisfy--needs can be extrapolated from current behavior. (2) The technological alternatives available--important developments are being made in transmission and switching equipment and user terminals. (3) The effectiveness of the alternatives for meeting the needs--studies should combine the laboratory and outside world and should focus on typical consumers as well as business users. (4) The secondary effects--impact studies are difficult and usually begin after the impact has been felt. An impact study approach can be to ask what constraints would be loosened by the presence of a technological development.

Ryan, Michael. "Interrogative Behavior in Business Telephone-Communication." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The purpose of this study was to predict the type of communication technology which will replace the telephone as a means of business communication by the year 2000 A.D. The report describes the parameters of interrogative telephone communication behavior in order to predict alternative communication media for future business communication. Specifically, it presents the findings of an analysis of interrogative communication behavior in business telephone conversations and draws forth implications for future communication technologies.

Ryan, Michael G. "The Influence of Teleconferencing Medium and Status on Participants' Perception of the Aestheticism, Evaluation, Privacy, Potency and Activity of the Medium." Communication Research Centre, Communications Canada, paper presented at Canadian-American Communication Symposium, Buffalo, May 1975.

The author investigated users' reactions to teleconferencing. The aim of the study was an attempt to compare audio and video teleconferences with face-to-face conferences. The study addressed the following question: What influence does the teleconferencing medium and status have on the aestheticism, evaluation, privacy, potency and activity of the conferencing medium? The study showed that a high channel capacity face-to-face conferencing medium was perceived as more esthetically pleasant and evaluated more positively than the narrow channel of audio teleconferencing. Moreover, audio teleconferencing was perceived as being more private than video teleconferencing. Other results of the study are discussed.

Ryan, Michael G., and Craig, James G. "Intergroup Telecommunication: The Influence of Communications Medium and Role Induced Status Level on Mood, and Attitudes Towards the Medium and Discussion." Communications Research Centre, Department of Communications, Canada, Paper presented at Annual Meeting of the International Communication Association, Chicago, 1975.

This study attempted to compare audio and video teleconferences with face-to-face conferences. The study addressed the following research question: What influence does the teleconferencing medium and role-played status level have on attitudes towards the medium, attitudes towards

the discussion and the participants' mood? The results of this study support the information theory paradigm which generated the research hypothesis. The information theoretic rationale for the hypotheses argued that attitudes towards the medium, towards the discussion, and the participants' mood would relate directly to channel capacity. Thus, attitudes towards the medium, discussion, and participants' mood would be most positive in the wide channel bandwidth face-to-face conferencing condition and least positive in the narrow channel audio teleconferencing condition. In this study, such was the case.

Ryan, M. G. and Rose J. F. C. "The Influence of Communication Medium and Role Played Status Level on Aggression, Anxiety, Concentration, Elation and Surgency." Unpublished manuscript, 1975.

The mood of the user in different communication media could well affect the potential use to be made of the medium involved. In this experiment, the Nowlis 'Mood Adjective Check List' was the dependent measure. Three different intergroup communcation media (audio, video with audio, and face-to-face) were tested on two occasions with federal government executives at a management development course. On both occasions a control group for 'status' was used. All individuals were placed in groups, and each group received all three different media but in different presentation orders. Partial support was found for the information theory paradigm which predicted that more positive mood states would be achieved in wide channel media.

Silverman, George. "Discussion Dynamics." On the Line, 16 Nov. 1970.

The author discusses some of his research in group dynamics that is especially relevant to Telesession participants. "The Blindfold Experiment" illustrated what can happen when the visual element is removed from conversation. The author experienced the absence of usual face-to-face problems: eye contact, crosstalk, distraction. On the other hand, there were some disadvantages as well: sensory deprivation, for example, and a self-consciousness about the normal gestures one uses when conversing. The question of interest then is: "Would the telephone incorporate the advantages of the "blindfold test" without the disadvantages? The author believes the advantages are obvious and the disadvantages are not there because one isn't blindfolded on the telephone. Therefore, although your eyes cannot establish contact with other speakers, they can operate normally providing the input necessary to function.

Sinaiko, H. Wallace. "Teleconferecing: Preliminary Experiments." Research Paper P-108, Institute for Defense Analysis, Research and Engineering Support Division, Nov. 1963.

This paper is one of a series on teleconferencing conducted by the Institute for Defense Analysis. Two purposes of the experimental phase of the Teleconferencing Project were: 1) to learn whether it would be profitable to conduct laboratory research in a more formal, teleconferencing project and 2) to gain some first hand experience in order to define procedural problems of teleconferencing. The laboratory studies gave positive support of both aims. Conclusions from the experiment are given.

Williams, Ederyn and Chapanis, Alphonse. "A Review of Psychological Research Comparing Communications Media." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The authors summarize laboratory research and fieldwork which compares face-to-face communication with communication via various electronic media. Results imply that in educational settings, telecommunication is as effective and acceptable as face-to-face communication. The studies also indicate that complex, expensive video systems are unnecessary for educational tasks. The authors conclude that, with the recent trend toward extension education, telecommunications may most benefit older, already-employed persons who wish to upgrade their skills.

Williams, Ederyn. "A Summary of the Present State of Knowledge of the Substitution of Face-to-Face Meetings by Telecommunicated Meetings: Type Allocation Revisited." Long Range Studies Divisions, Post Office Corporation, P/74294/WL, London, 1974.

The type allocation process is described as consisting of four stages: 1) the definition of the different types of face-to-face meetings, 2) the allocation of these types of meetings to media which would effectively accommodate them, 3) the measurement of the frequency of the different types of meetings, 4) the calculation from (2) and (3) of the proportion of face-to-face meetings which could be transferred to various telecommunication media. Each of these four stages is discussed in detail. The bulk of the paper consists of the discussion of the laboratory work on the effectiveness of telecommunication media as compared to face-to-face communication. Twenty-nine laboratory experiments are described. On the basis of meeting task alone, a majority of meetings seem capable of transfer from the face-to-face mode in which they now take place to a telecommunication medium, and for those meetings which can be so transferred, a majority seem transferable to an audio only medium, a minority require a full audio-video medium.

Zimmerman, Harry. "Assessment Concepts for the Educational Telephone Network." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The article's major theme is assessment for the purpose of program development in Educational Telephone Communications. The author states that his efforts should be thought of as the study of complex phenomena involving the fields of education and communication. The unifying concept is that of program development, and the assessment procedures involve both a program effectiveness checklist and a cost/benefit approach.

Zimmerman, Harry, et al. "Educational Communications Research: Educational Telephone Network." Unpublished Manuscript, University of Wisconsin-Extension, Madison, Jan. 1968.

Research in educational telephone communication is perceived as the study of a complex phenomenon which involves the fields of education and communication. Two major variables are examined: the profile of the adult participant and the components of educational communication. Participant information and program evaluations were obtained through the development of a rating scale, the Program Evaluation Checklist. The

research instrument was employed in the evaluation of a library science, educational telephone network program. The research design and results are presented and discussed.

Zimmerman, Harry. "Evaluation Inference Applied to Programming on an Educational Telephone Network--A Beginning." Paper presented at the Adult Education Research Conference, Minneapolis, Minn., Feb. 1970.

A study was made of a noncredit home economics program presented by the University of Wisconsin-Extension over the statewide Educational Telephone Network (ETN). The study was limited to the total population involved in one program (54) and their immediate reaction to that program. Methodology used was a combination of action research and field research. The instrument was developed around six factors: environment, content, program process, lecturer, moderator and technical qualities of the ETN. Variables concerned with the various factors were interspersed and resulted in 48 items plus a nine-point scale for an overall assessment of the program. A four-point interval scale was used with each of the 48 variables. The instrument was open-ended, with provision for suggestions for improvement. Subjective evaluative inference based on means and standard deviations indicated the overall program was somewhat better than a possible average but with room for improvement.

Technical

Alvarez, J. A., Grote, W. W. and Nahabedian, C. E. "Conferences and Classes Via PCT: If You Can't Come, Call," Bell Laboratories Record, April 1973.

With extension microphones and more power than its sister unit, the speakerphone, the Portable Conference Telephone, can be used for large classes or conferences. Technical changes and modifications since its inception are outlined. Examples are given of the business and educational institutions which have already adopted the PCT.

Braun, D., Gilbertson, D. and Hansen, H. "ETN: A Technical System." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The intent of the paper is to present a picture of Wisconsin's ETN (Educational Telephone Network) as a technical system. The authors describe what exists today, user's requirements, general design criteria and some of the problems and solutions encountered during ETN's development and implementation phases. The three major components of the ETN system, which are examined in the article, consist of the network organization studios and control rooms, the statewide telephone transmissions system and the individual station location equipment. Photographs and diagrams of equipment and equipment set-ups are given.

"Lectures by Phone: Network Aids Education." Trend, Oct. 1975.

The article describes how the Educational Telephone Network (ETN) has improved its equipment, thereby expanding network size and the type of programming planned.

Parker, L. A. "ETN System Instructions/Technical Data." University of Wisconsin-Extension Brochure, Instructional Communications Systems, Madison, 1973.

This brochure includes an introduction to Wisconsin's Educational Telephone Network, describes who benefits from the Instructional Communications Systems (ICS), gives the technical specifications of the system and concludes with user instructions and packing and storage directions for the Darome Edu-Com Portable Station set.

Pinches, Chris. "Some Technical Aspects of Teaching by Telephone." Teaching At A Distance, The Open University, Milton Keynes, U. K. 1974.

The author discusses some of the limitations placed by technology on teaching by telephone and outlines some of the improvements which can be achieved with well-designed instruments. He covers the disadvantages of the handset telephone and the amplified telephone. Lastly, he explores the systems presently available which provide the visual element.

Pinches, C. A. "The Technological Side of Teaching by Telephone." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author's concern in this paper is with the technical problems of teaching by telephone, but these technical problems are often related to the "interface" with the equipment.

Seyler, J. "Electronic Blackboard Permits Graduate Engineering Course Offerings to Engineers in Industry." 1976 College Industry Education Conference Proceedings, University of Illinois, Champaign, 1976.

The University of Illinois at Urbana-Champaign has, for the past ten years, been particularly interested in developing an effective program to better serve engineers in the state of Illinois. They now have a delivery system composed of telephone and electronic blackboard, which has most of the advantages of all the systems used to date, and very few, if any, of the disadvantages. This system is being used to present graduate engineering and/or continuing education engineering courses and conferences in several cities in Illinois simultaneously. To date, the evaluation of the system and the educational program has been very encouraging, particularly in view of the quality of the program generated.

Teleconference Systems

Box, Roger. "The Oklahoma Teleconference Network, A Bridge to Continuing Education and Communication Between Health Professionals and Hospitals." Unpublished manuscript, Oklahoma Regional Medical Program, Oklahoma City.

The article gives a history of the Oklahoma Regional Medical Program (ORMP) since its inception in 1966. The author briefly discusses the ORMP's scope and flexibility and assesses and evaluates the telephone networks system's value. Due to the success of ORMP, new teleconference projects in Oklahoma have originated. The author gives a profile of an urban development project in Oklahoma City, and an areawide development program--ADA.

"A Brief History of the Network." Unpublished manuscript, Division of Continuing Education, Kansas State University, Hoxie, 1972.

This paper provides a detailed account of the progress of the Kansas educational telephone network from its beginning in spring of 1970 to 1972. The expansion of the network has enabled each of the six Regents Schools to make available throughout Kansas their specific specialties. The network seems to "have a great future."

Dobbs, Ralph C. and Mowrer, John L. "Updated Party Line for Adult Education," Journal of Extension, 9 (3), Fall 1971.

The Missouri telephone lecture network is presently used for extension programming with health professionals. But there's potential for extending this technique to many adult groups--professional and nonprofessional. The authors describe why the network was established, how it works and some of its advantages. The greatest advantage of the system for the participant is he need not travel long distances to attend professional meetings. The outlet for the system is often in the same building where he works.

"Expanding Educational Network Based on Party Line Hook-Up." Telephony, 22 Aug. 1970, pp. 19-21.

This report explains how Wisconsin's Educational Telephone Network (ETN) equipment works and the uses to which it has been put.

"Fifty-one Hospitals Linked by Phone Lecture Network." Telephony, 7 Feb. 1970, pp. 23-26.

Medical professionals in western New York and eastern Pennsylvania now have access to a two-way communications system through a telephone lecture network. The base of the network is the Regional Medical Center in Buffalo, New York. It is connected with five hospitals in the two states. On the whole, participants find it to be a flexible means of presenting material, a system able to reach outlying areas at an economical price.

King, Harold D. "The Early Years of the Educational Telephone Network in Wisconsin." Unpublished Article, University of Wisconsin-Extension, Madison, Nov. 1968, pp. 1-3.

The author discusses the use of the telephone for education, both as an individual instructional tool and as an educational telephone network. He describes how Wisconsin's Educational Telephone Network has been used, giving examples which illustrate the expansion of the network from 1962-68. He attributes the network's growth to technological improvements and the efforts of enthusiastic educators and participants.

King, Harold D. and Parker, Lorne A. "Wisconsin's University Extension Educational Telephone Network." Telelecture presentation from Madison, Wisconsin to University of Minnesota's Annual Extension Conference in St. Paul, Minn., 23 Oct. 1968.

The authors aim to present information on the telephone as a way to move increasing amounts of information to increasing numbers of Extension clients: what ETN is, how it is being used in Wisconsin, how Extension agents, clients and administrators are responding to it, and some of its potential.

King, Harold D. and White, Maurice E. "SCA and ETN Give State-Wide Meeting Without Travel." Extension Service Review, United States Department of Agriculture, Extension Service, 39 (10), Oct. 1968.

The authors explain the Educational Telephone Network and the Subsidiary Communications Authority: how they function, who takes advantage of them, and the variety of ways the "party line" (ETN) and "Piggyback FM" (SCA) are being used by University Extension faculty.

Myers, Kent C. "Learning by Telephone." The Clearing House, April 1965.

The author describes how the Oregon Program for the Lake Oswego Public Schools initiated a telelecture system at minimal cost and effort. The author suggests steps to be taken in planning the system and in organizing a telelecture program. He concludes with a listing of the educational advantages of the telelecture method

Pace, William G., Scheikart, Robert B. and Watson, Rodney A. "Ohio Medical Education Network - 1969-1970." Unpublished manuscript, Ohio State University, Columbus, Nov. 1969.

The author discusses what the network has been doing to overcome the "communications lag" by providing postgraduate training in the doctor's own hospital at the minimum of inconvenience and time lost from patient care. Activities of the Ohio Medical Education Network were broadened to include training for nurses and broadcasts over television.

Parker, Lorne A. "Bringing the Boundaries of the Campus to the Boundaries of the State." Views, 53 (20), Feb. 1968, p. 9.

The author discusses Wisconsin's Educational Telephone Network: what it is, why it started, the benefits of the system such as convenience and flexibility, courses offered via the telephone network and future plans for expansion of the system.

Parker, Lorne A. "Educational Telephone Network and Subsidiary Communications Authorization: Educational Media in Continuing Education in Wisconsin." Communication News, June 1972.

The author explains why the Educational Telephone Network (ETN) and Subsidiary Communications Authorization (SCA) were developed, how the systems work, charts their growth, discusses the types of programs offered on ETN-SCA and explores the various ways the networks are used. Evaluation of the ETN-SCA systems involves the measurement of both education and communication. The author lists some of the advantages to the systems, and mentions that the response to the Educational Telephone Network in Wisconsin has been varied, but is generally favorable.

Parker, Lorne A. "The Educational Telephone Network and Subsidiary Communications Authorization (SCA Piggyback)." University of Wisconsin-Extension, Madison, 1967.

The author explains what Wisconsin's Educational Telephone Network (ETN) is and how it operates. An explanation of how SCA is transmitted on the FM Channel is given, and charts are included which show the FM Channel and the breakdown of the FM signal.

Parker, Lorne A. "ETN . . . A Way Not to Travel." Telephone Engineer and Management, 15 Aug. 1974, p. 64.

The article covers briefly what Wisconsin's Educational Telephone Network (ETN) is, why it

originated, how it operates and talks of the many ways in which the system can be used. The author lists the special capabilities which make it significant as an educational medium: it provides "continuing education," offers great economy in time and money, reaches audiences previously neglected, and reaches talented professionals who otherwise would be in an educational vacuum.

Parker, Lorne. "Teleconferencing as an Educational Medium: A Ten Year Perspective from the University of Wisconsin-Extension." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

This paper recounts the history of the development of the University of Wisconsin-Extension's Educational Telephone Network (ETN), and Statewide Extension Education Network (SEEN), and discusses the operation of these systems today. Equipment, cost, technical status, program evaluation and administration of ETN and SEEN are covered in some detail.

Parker, Lorne A. "Wisconsin Idea Joins the Party Line." Program Preview, 1 (9), Nov. 1968, pp. 19-21.

The author describes what Wisconsin's Educational Telephone Network (ETN) and Subsidiary Communications Authorization (SCA) are, why they were developed and how they function. The author also discusses the possible uses for the systems: the ways in which the boundaries of University Extension can be extended to better serve the educational needs of the state.

Parker, Lorne A. "Wisconsin's Educational Telephone Network." Wisconsin School News, March 1968, p. 8.

The author covers briefly what Wisconsin's Educational Telephone Network (ETN) is, why it was developed and discusses what a typical program on the network is like. The author concludes with a discussion of the educational use of the ETN and Subsidiary Communications Authorization (SCA) systems.

Pfeiffer, John. "Network Facilities Offer Academic Expertise." Audiovisual Instruction, Feb. 1971.

The Kansas City Regional Council for Higher Education is one of the oldest educational consortiums in the country--one whose 18 member colleges decided they could accomplish more collectively than if they functioned independently. Communication among the member campuses was slow, even archaic, before the establishment of the KCRCHE network. Most needed was the ability to place conference calls among the 18 campus locations. To achieve this flexibility, the network was custom engineered. In addition to conferencing and telelecture programs, the network sponsors inter-college debates and transmits other types of programs, demonstrating the versatility and flexibility of the system.

"Progress Report from Oklahoma Regional Medical Program." Oklahoma Medical Regional Program, University of Oklahoma Health Sciences Center, Oklahoma City, March 1975.

The report begins with the "reason for Regional Medical Programs," and is followed by the changes and progress that have taken place since the project's inception in the late sixties. The purpose of the brochure is to describe ORMP's new directions (the emphasis for 1975) and how those in the program hope to help change and improve the delivery of health care for the people of Oklahoma.

Raccoli, Susan. "Bringing In-Service Education to Your Backyard." Wisconsin School Musician, Feb. 1975, pp. 10-11.

The author gives a brief explanation of the origins of the Educational Telephone Network (ETN) and how the system functions. Examples are given of the wide variety of program offerings on the system. She feels ETN to be flexible, economical, and efficient. A list of the ETN Listening Locations in Wisconsin is included.

Rookey, Ernest J., Gill, Lester W. and Gill, F. Jean. "An Educational Telephone Network." Educational Technology, Dec. 1971.

The authors tell of the development and expansion of the educational telephone network system in Finger Lakes Region, New York. The system had been in use for three years (1967-December 1971) and had been found to be valid as an instructional medium. The authors conclude that the medium does require some special handling, but nothing that a typical school district cannot provide with its existing personnel.

Schweikart, Robert and Bartfay, Arthur. "The OSU Center for Continuing Medical Education's Efforts to Bring Two-Way Instruction to the Health Professions." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

This paper examines the four networks of the Center for Continuing Medical Education of the Ohio State University of Medicine (a T.V. network for physicians, an FM radio network for pharmacists, an FM network for nurses, and the Ohio Medical Education Network, an audio network for physicians). Emphasis in the paper in on OMEN audio network for physicians, which began its fifteenth year of service in September of 1976.

"Two-Way Telephone Network Series." Regional Medical Program of Western New York, 1 (3), April 1968.

In an effort to help solve the problem of the "information gap," H.O.W.N.Y. (Health Organization of Western New York) has established a two-way communication network system which is designed to link the hospitals of Western New York and Erie County, Pennsylvania, and other regions with the Continuing Education departments of the State University of New York Schools of Medicine and Nursing and Rosewell Park Memorial Institute.

Vernon, Edwin. "Illinois TeleNet 70-76." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

The author describes the development of the Illinois TeleNet (forty-eight station dedicated telephone network) between 1970-76. Equipment used, programming and evaluation are the major areas covered.

Vernon, E. W. "TELENET--A New Educational Tool Helps Extension Service Reach Wider Audiences." Illinois Research, University of Illinois Agricultural Experiment Station, 13 (2), Spring 1971.

In 1971, the University of Illinois' Cooperative Extension Service had a new educational tool known as TeleNet. This private telephone network linked together 19 stations, most of them in county extension offices. Plans called for the network to expand to 23 stations. The article

includes reasons why the network was started and goals for its future.

Wecke, Harold. "The UNIVEX NET Teaching System." Unpublished manuscript, University of Illinois-Extension, Champaign, 16 June 1969.

This paper explains what the University of Illinois UNIVEX system is and how it operates. In the fall semester 1968, an extensive and systematic evaluation of this method of instruction was undertaken. The paper explores four categories of information used in making this evaluation: 1) final grades earned by UNIVEX students compared to on-campus students, 2) course evaluation questionnaire responses of remote students compared to students on campus, 3) written comments from off-campus students, and 4) written comments from instructors using the UNIVEX NET The results of this evaluation indicate that teaching via the UNIVEX NET was not only feasible from a technological point of view, but that such instruction was also effective from an educational viewpoint.

General

Baird, Marcia and Parker, Lorne A. "Introduction to Teleconferencing." Unpublished manuscript, University of Wisconsin-Extension, Madison, Jan. 1976.

The paper deals with the basics of teleconferencing: what teleconferencing is, the uses to which it can be put and the types of teleconferencing. The authors examine what factors make telephone systems successful, discuss current activity in the field of teleconferencing, and briefly review research projects in teleconferencing. The authors conclude with eight advantages of the teleconferencing system.

"Communications Behavior Laboratory." Communications Research Centre, Dept. of Communications, Ottawa, Ontario, Canada.

This paper discusses the laboratory: its purpose, rationale, research plan (voice stress, physiological stress, psychological stress and possible future studies) and resources (personnel, space, equipment).

Craig, James G. "Pros and Cons of Audio Teleconferencing." Paper in part presented at a Teleconferencing Symposium at Bell-Northern Research, Ottawa, Jan. 1975.

The author, in a point-by-point fashion, covers reasons why the need for teleconferencing is increasing and how teleconferencing can partially meet these growing needs. He then proceeds, in the same manner, to list the behavioral and organizational advantages and disadvantages of audio teleconferencing. For these last two categories, the author accompanies each point with a reference.

Daniel, John and Turok, Ben. "Teaching by Telephone: A Two-Way Communication Mode in Distance Education." Proceedings of the Tenth ICCE World Conference, Brighton, England, 1975, pp. 133-40.

An examination of telephone teaching systems in several areas of the world indicates that technical problems need not be obtrusive. However, this study also reveals that to date most such systems have been developed to extend classroom courses, and that success in this venture depends on three factors; the simplicity and flexibility of the equipment used, the unattractiveness to the students of the available alternatives, and the provision of quality written materials.

"Dial 'F' for Future." Science News Letter, 28 Aug. 1965, pp. 134, 142.

This brief article explores some of the possibilities of the telephone in the future, and speaks of what was being done with the telephone in 1965 to increase its uses and to provide more services to its users.

Grabowski, Stanley M. "The Telephone as an Instructional Method in Adult Education." Adult Leadership, Sept. 1972.

This article explains the various types of teleteaching: telelectures, teleconferences and telewriting, and gives examples of what systems across the country are doing in undergraduate and graduate programs, refresher courses, extension programming and continuing professional education. The author outlines Peterson's conclusions (from studies conducted at the University of Wisconsin's home economics department) and concludes the article with supplementary documents relating to various aspects of instruction by telephone.

Hicks, Bruce L. "CIDAC-A Concept in Educational Technology." Audiovisual Instruction, Sept. 1971.

The author discusses two devices he feels are promising that are under the generic term CIDAC (Communication Among Inexpensive Displays and Computer), and describes their educational applications. It appears that CIDAC could provide computer-assisted input and output in graphic form, could supply several types of recording and storage, and could be operated at a distance.

Lewis, Philip. "Telecommunications: New Party Line for Education." Nation's Schools, 78 (3), Sept. 1966.

The author explains, based on experience with a telephone lecture program at Stephens College, Missouri, how telelectures work, what the costs involved are and how the network is able to reach shut-ins. He also discusses how fascimile units, electrowriters and slow-scan television operate.

"Librarian is Awarded Certificate." Oshkosh Northwestern, Wisconsin Press Association, Clipping Bureau Division, 9 Aug. 1968.

Part of the article deals with librarian, Nancy McCue, and her impressions of the Educational Telephone Network (ETN) course she participated in. She found the Library Science program gave her practical help in her field, and she gained much from discussions with other librarian students. The article mentions that the lectures were "relayed to other centers by telephone."

Oakland, Don. "ETN Class Extends Statewide." Clintonville Tribune, 1 May 1975.

This article includes a brief explanation of how ETN works and how it began. What is unique is that the article talks of ETN from a student perspective, as Don Oakland relates his experiences with the Educational Telephone Network.

Parker, Lorne A. "The Development and Utilizations of Subsidiary Communications Authorization." Educational Broadcasting Review, 3, Dec. 1969.

This article is based on the author's book, SCA, A New Medium (Madison: University Extension, University of Wisconsin, 1969). He gives a brief history of Subsidiary Communications Authorization systems, describes the technology, and treats

extensively the commercial and educational utilizations.

Parker, Lorne A. and Riccomini, Betsy, comps. A Report on University Applications of Satellite/Cable Technology. First Annual International Communications Conference, University of Wisconsin-Extension, Madison, June 1975.

The broad aim of the conference was to stimulate an ongoing discussion among universities, industry and government on the national and international possibilities of satellite and cable development in the next decade. The report is designed primarily for educators, technologists and government officials to give them a basic grasp of the potentials of satellite/cable TV for education.

Parker, Lorne A. and Riccomini, Betsy, comps. The Status of the Telephone in Education, Second Annual International Communications Conference, University of Wisconsin-Extension, Madison, May 1976.

This book is a collection of papers presented at "The Telephone in Education Conference" held in May 1976, by the University of Wisconsin-Extension, Madison. Essays cover a wide spectrum of topics dealing with teleconferencing, ranging from instructional design and technical advances to case studies and research reports.

Rao, Paladugu V. and Hicks, Bruce L. "Telephone-Based Instructional Systems." Audiovisual Instruction, April 1972.

The authors review the history of telephone-based instructional systems, and the advantages and services they provide for students, for educational planners and for school districts. The full potential of the telephone as an instructional communications device has not yet been realized, state the authors. The article provides some ideas for people who might not have realized how the telephone can be used.

Short, John. "Teaching by Telephone: The Problems of Teaching Without the Visual Channel." Paper delivered at a conference on Teaching by Telephone, Westfield College, London University, April 1974.

The article lists the advantages of the use of the telephone for educational purposes, business purposes, etc., and deals with limitations inherent in the use of the telephone. Despite these limitations, the practical advantages of teaching by phone can be considerable and most problems associated with communication in the absence of the visual channel can be overcome.

Sivertson, Sigurd and Hansen, Richard H. "The Role of Technology in an Evolving Continuing Education Program for Health Professionals." Medical Program Technology, 1 (4), 1973, pp. 187-95.

The author reports on seven years experience in utilization of instructional technology in continuing education programming at the University of Wisconsin. Specific media and methodology used include telephone conferences, dial access library, single concept films, tape/slide programs and slow scan television, with attempts at evaluation of each described.

Turok, Ben. "Teaching by Telephone for Disadvantaged and Remote Students." The Status of the Telephone in Education, University of Wisconsin-Extension, Madison, May 1976.

Not all Open University students are able to make use of the face-to-face tutorial service provided for them. Some of these students are homebound, others live too far, in terms of time effort and cost, from the Study Centres to atten The telephone seems to be one alternative to maintain regular two-way contact with these disadvantaged and remote students and to provide them with a group learning experience.

Yeomans, G. Allan and Lindsey, Henry C. "Telelectures." The Speech Teacher, 18 (1), Jan. 1969.

This article describes what telelecture is and gives a brief history of some of the institu tions which have utilized, in different ways, th amplified telephone teaching system. Advantages of using the telelecture system are given and include: flexibility, low cost and convenience. In addition, because the telelecture method has been shown to be used extensively and diversely, it presents an opportunity for new horizons in the speech classroom.